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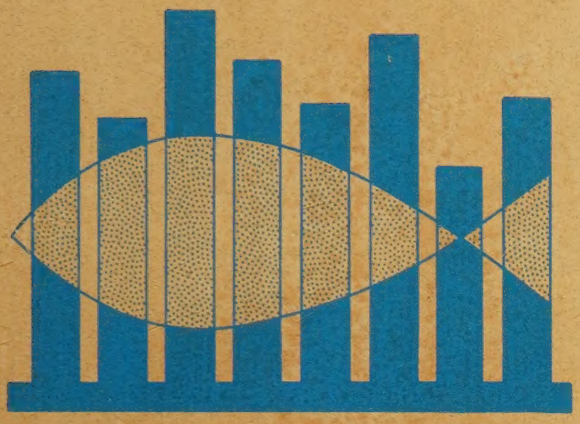

Requirements and Improvement of Fishery Statistics in the North Atlantic Region

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
ROME, 1962

FAO Fisheries Reports series

This is the third in a series of reports of meetings, surveys and other activities of FAO Fisheries Division. Some unserialized reports dated earlier than January 1962 are listed on the inside back cover of this document. Certain unserialized reports may be reprinted in this series as the unserialized versions go out of print.

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REQUIREMENTS AND IMPROVEMENT OF FISHERY STATISTICS IN THE NORTH ATLANTIC REGION

Report based on documents of the Expert Meeting on Fishery Statistics
in the North Atlantic Area, held in Edinburgh, Scotland
22-29 September 1959

Edited by
B. B. PARRISH

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1961

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PART 1

INTRODUCTION

1.1 PURPOSE AND SCOPE OF MEETING

1. The importance of fishing, of fish preservation and processing, of domestic and international commerce in fish commodities and of fishery management, has grown rapidly in recent years. At the same time, the awareness of governments, private institutions and the public, to the value of quantitative information, in making decisions about the utilisation of fishery resources, has increased. In addition, such information has become of paramount importance to the international councils, commissions and other agencies, which have been established throughout the world. As a result there has been:

   (a) a great expansion, at the national level, in the collecting, processing and dissemination of relevant fishery statistics, in an effort to meet the needs of governments, private institutions and the public;

   (b) an increase in responsibilities of the statistical offices of international fisheries agencies, which compile, process and publish on a regional or world-wide basis, statistics supplied by national governments.

2. These activities have led to the formation of a complex world-wide structure of statistical data, covering the various phases of production, processing, distribution and consumption of fish and fish products. However, the various parts of this structure have largely grown independently of one another. Consequently, the fishery statistics published at the national and international levels have often not been as comprehensive, detailed, accurate, timely and mutually comparable as is desirable or necessary to meet the demands at the national and international levels. These deficiencies and difficulties have been felt particularly keenly by the international statistical agencies which are dependent upon detailed, timely and mutually comparable data, supplied from national sources.

3. As a first step towards improving this statistical structure, the Food and Agriculture Organization of the United Nations convened a meeting of representatives from North Atlantic countries in Copenhagen, Denmark, in May 1952. This meeting was of an exploratory nature, devoted principally to examining the statistical requirements of the principal categories of users, and the current problems involved in supplying them 1/. This meeting, and the rapid growth in the activities of national and international fisheries agencies, provided a stimulant for detailed consideration of many of these problems, and for clarification of the principal deficiencies, difficulties and stumbling blocks to further progress in improving the statistical data. Further, it revealed that many of the deficiencies and difficulties facing the international statistical offices were of a technical nature, stemming from differences in the methods of statistics collection, processing and dissemination at the national level. It soon became clear that, for their solution, a further meeting of experts was required, which would concentrate on technical problems within a defined area, and examine them systematically for the purpose of making specific recommendations for consideration and action by the national and international authorities concerned.

1/ The report of this meeting has since been published by the Food and Agriculture Organization under the title "Purposes and Methods in Fishery Statistics: Report of the First International Meeting on Fishery Statistics held in Copenhagen, Denmark, 26 - 30 May, 1952"

4. It was considered that the area most appropriate for such a study was the North Atlantic, due to the relatively advanced state of national fisheries' organizations there, and of the existence in this area of important regional fishery commissions and councils, with active statistical offices. An "Expert Meeting on Fishery Statistics in the North Atlantic Area" was, therefore, organized by the Food and Agriculture Organization of the United Nations (FAO) with the International Council for the Exploration of the Sea (ICES) and the International Commission for the Northwest Atlantic Fisheries (ICNAF) acting as co-sponsors. It was held in Edinburgh, Scotland, from 22 - 30 September 1959, at the invitation of the United Kingdom Government. All countries and organizations with fisheries or fishery interests in the North Atlantic were invited to participate.

5. The aims and scope of the Meeting were defined in its prospectus as follows:-

(a) to examine briefly the uses to which fishery statistics are put, so as to arrive at some understanding of what is required by various users (e.g. government administrators, biologists, economists, business men, national and international agencies), and at some conclusions about relative priorities;

(b) to expose the chief difficulties now met in fulfilling the requirements, particularly those to which a high priority must be assigned;

(c) to suggest what should be done to eliminate or reduce these difficulties, including such matters as improving, and standardising where appropriate, classifications and definitions, rationalising the allocation of various statistical activities, and co-ordinating national and international fishery statistical activities; and

(d) to indicate what might be done to further improve fish statistics, particularly consistency and comparability (e.g. as between statistics of different phases of the industry, between those of the fishing industry and those of other sectors of the economy, between statistics of different countries and between those of different international organizations), both within national and international statistics.

6. This formulation established the essentially technical nature of the subject matter for the Meeting, and defined its main tasks as:- (1) the identification of the statistical requirements; (2) the search for solutions to the current deficiencies and technical difficulties in meeting them, and (3) seeking improvements and greater efficiency in statistical compilation and dissemination at the national and international levels.

1.2 ORGANIZATION OF MEETING AND PROGRAM OF WORK

1.2.1 EXTENT OF SUBJECT MATTER

7. In considering problems of statistics relating to fish and fish products, it is often convenient to distinguish statistics relating to three phases of the industry and, in addition, those relating to the consumption of fish and fish products. The data covering each of these phases of the industry can be

classified under: (a) structure, and (b) operations; the latter, in turn can be sub-divided into (i) inputs, and (ii) outputs.

8. The primary phase, or fishing industry, consists of catching, or otherwise taking, and landing aquatic animals and plants. This phase also includes preliminary processing activities carried out incidentally to catching and landing, e.g. cleaning, gutting and icing.

9. The secondary phase, or fish processing industry, consists of preserving (e.g. freezing, salting, drying, curing, canning), or otherwise transforming (e.g. filletting, reducing to meals and oils) the landings for human consumption or other uses.

10. The tertiary phase, or fish distributing industry, consists of assembling, storing, transporting, wholesaling and retailing fish and fish products, including both domestic and international trade.

11. Food consumption includes the use of fish and fish products for human nutrition as well as for animal feeding and for other agricultural and industrial uses.

12. This division reflects not only differences in technical operation, which call for different kinds of statistics and statistical approach, but in many cases, the three phases of the industry are carried out by different groups of operators and sometimes are geographically distinct. As a consequence, the respective statistics are often the responsibility of different statistical agencies or divisions of an agency. Therefore, it seemed appropriate to the organizers of the Meeting that the major items of subject matter relating to these phases should be treated in detail by two main committees, the first (Committee I), dealing only with the primary phase (fishing industry) statistics, and the second (Committee II), dealing with the secondary and tertiary phases (processing and distribution industries), and consumption statistics, while items of more general relevance should be handled in plenary sessions of the Meeting.

1.2.2 OPENING FORMALITIES

13. The meeting was formally opened by Lord John Hope, Joint Parliamentary Under-Secretary of State for Scotland, at 10.45 on Tuesday, 22 September 1959, with the following words:-

> "I would like first of all on behalf of Her Majesty's Government to welcome you all to this Conference; and to those who come from overseas or from south of the Border may I, as a Scottish Minister and a native, extend a hand of cordial greeting as you assemble in our City of Edinburgh. I hope that the important and no doubt prolonged discussions which lie ahead of you will not prevent your seeing something of this historic capital and of the countryside round about. I hope you will take away from your ten days' stay not only a sense of useful labour done, but also some enjoyable memories of what I am proud to believe is a very pleasant part of the world.
>
> "I was particularly pleased to be asked to open your meeting today. The Scots are a sea-faring race and I cannot but be interested to meet such a gathering of experts on matters relating to the sea. I am expecially delighted to see such a large representation from so many of the countries which fish in the Atlantic area. Scottish fishermen's contacts with some of them go back a very long way. In a book written more than 150 years ago by one of His Majesty's Excise officers in these parts, which

discusses the state of the Scottish fisheries at that time, and indeed, suggests that they might well adopt some good ideas practised on the other side of the North Sea, the author refers to the brisk herring trade which had been carried on by Scottish vessels with countries in the Baltic, another 150 years earlier. This international fisheries meeting is therefore heir to a very venerable tradition. Since this is, however, the first occasion on which FAO has been associated with a meeting in Edinburgh on the subject of fish, I would like to pay tribute to the valuable work which that organization continues to perform for the fishing industries of all countries and expecially to their initiative in arranging this conference. With their two co-sponsors of the meeting - ICES and ICNAF - we have more frequent contacts but it is all of ten years since we were able to act as hosts to ICES here in Edinburgh and to them also I should like to express cordial appreciation of their presence and of the vital international role they are playing in fisheries science and conservation.

"What I should finally like publicly to recognise is the importance of the work on which you are all engaged. To many people statistics may seem a rather arid subject. Indeed, modern man is all to prone to think that the filling of forms and the collection of statistics are the twin prongs of a devilish fork with which troublesome officials delight only to goad him. The salty nature of their calling perhaps makes the sturdy fishermen prone to the view that an ounce of practical fishing experience is worth a pound of statistical tables. Of course, we need always to remember the flesh and blood behind the statistical digits. There is more to fishing than just numbers. But it is a serious mistake to decry the value of statistical work. Prosperous fishing industries depend now more than ever on increasing our knowledge about the fish in the sea, about how best to catch them and how to make the most economic use of them when they are caught. The facts from which new knowledge in these fields can be built up must in the last resort be largely statistical.

"We have, I hope, made some progress since the time, 100 years ago, when a Royal Commission appointed to enquire into the sea fisheries of the United Kingdom confessed themselves unable, in the absence of trustworthy statistics extending over a considerable number of years, to reach any conclusion whether or not the inshore fisheries had been damaged by over-fishing. I am glad to be able to record, however, that even then they noted one honourable exception to this absence of information - the statistics of the northern herring fishery collected by the Scottish Fishery Board. Our herring fishery statistics in Scotland in fact go back at least to 1809 and I hope that the chart which you may have noticed on the wall will suggest to you that our long experience has not been entirely wasted.

"Obviously, however, the statistics, however long the tradition behind them, must be kept under review to see that they cater adequately for changing needs and if we are to add to the common pool of knowledge and experience, statistics must be available from all the countries fishing the same grounds and the same stocks of fish. It is a great help, particularly to the international organizations which we support if the figures collected by different countries can be easily compared and combined. The importance of fish processing and consumption and its contribution to national diets, as well as its place in the nation's economy, are other matters, the importance of which is receiving increasing recognition. I have no doubt at all that if this meeting can show the way not only to the production of better statistics but also to the better use of statistics in fishery matters it will do something of real help to the fishing industries which are of such economic importance

to our countries. Many of you have already written papers to stimulate your colleagues' thinking and clarify the issues for the conference; I am sure you are all now eager to get started on the task which lies before you and I must not delay you longer. I had been looking forward to the opportunity of meeting you all personally this evening but unfortunately the exigencies of the Election in which as you know we are now engaged make it impossible for me to keep this engagement. I am very sorry that I shall have to deny myself the pleasure but my colleague Lord Forbes, Minister of State for Scotland, will be receiving you instead. I wish you every success in your discussions and a pleasant stay in our City".

1.2.3 ELECTION OF CHAIRMAN AND CHAIRMAN'S OPENING REMARKS

14. After expressing thanks for this welcome on behalf of the three sponsoring organizations, Mr. F.E. Popper (FAO), called for nominations for chairman for the Meeting. Mr. A.J. Aglen (U.K.) was elected, after nomination by Drs. D.J. van Dijk (Netherlands), seconded by Mr. H. Angerman (Norway). In accepting office Mr. Aglen made the following remarks:-

"My first duty is to express to you my thanks for the honour you have accorded me in electing me as your Chairman. I appreciate it very highly and I shall endeavour faithfully to discharge the trust you have placed in me by doing my best to assist in the smooth working of this Conference so that it may arrive at conclusions which will be useful to all concerned. I would observe, however, that the smooth working of a Conference depends as much on the participants as on the Chairman and I feel sure that I can rely on your co-operation in making it a success.

"I do not pretend to be an expert on statistics. But as a fisheries administrator I have, of course, like most of you, had a good deal to do with them both at home and on the International Bodies I have attended. I must confess that I have often been frustrated by finding that there are no available statistics relating to a particular question I have been dealing with. (I have often also been somewhat frustrated when I have found that there are available statistics but that they don't support the arguments I wished to use - at any rate to begin with.) But in the twelve or so years in which I have been strictly concerned with fisheries I have noticed that the gaps in statistics have become fewer as the statistical services have developed - evident testimony to the fact that fishery statistics are far from being static. On the contrary like the fisheries themselves they are dynamic and in course of evolution.

"I am personally very glad that the FAO selected Edinburgh as the venue for this meeting and to welcome here so many old friends as well as quite a few whom I have not had the pleasure of meeting before. I regard it as a particular honour to be Chairman of this Conference for I believe that although, as Lord John Hope has said, it will be dealing with a subject which many people regard as rather dry and uninteresting, and even distasteful, it is nevertheless one of very great importance for all those concerned with fisheries in all its aspects. Our deliberations may not hit the headlines, but I am sure that we have a very worthwhile job to do, and that if we do it well we can make an important contribution to the work, over many years to come, of the international organizations which are sponsoring this meeting and also the work of the participating Governments and other national agencies and to the fishing and related industries of our countries.

"It is a commonplace of our age that good statistics are one of the necessary tools of industrial management. That applies as much to industries concerned with fishing and fish products as to others. And with different objectives and a change of emphasis it is true of trade associations, co-operatives, national agencies and of Governments and of the international bodies concerned. But in a sphere of activity which, from its very nature, calls for such a high degree of regulation and international co-operation as fishing, good statistics form an essential part of the equipment of Governments and of the international bodies concerned. More than that, however, statistics of catches and fishing effort form a most important part of the data of the fisheries scientists whose researches are fundamental to the maintenance of the fish stocks upon which depend not only the fishing industries but all the others dependent on fisheries - processors, distributors and even consumers. In singling out statistics of the catches for special mention I do not wish in any way to minimise the important of the other statistics with which we shall be dealing; but I think it may help us to appreciate the great importance and urgency of some of the problems we shall have to consider to remember that in an area like the North Atlantic, on both sides of which highly developed fishing industries from many countries work side by side, it is of special importance to keep an eye on the toll that is levied on the fish stocks and to see that adequate measures are taken for their conservation based on scientific evidence. That is the primary interest of the two co-sponsoring organizations and of the third related body - the Permanent Commission - for whom I am acting as observer at this meeting. An essential element in this process is to have full and proper statistics.

"It was indeed I think for this very reason that ICNAF at its meeting in Lisbon in 1957 drew attention to the need for further study and suggested that FAO should consider following up the earlier Conference which they organized in Copenhagen in 1952 by arranging another Conference. I think I am speaking for you all when I say that we are indeed grateful to the FAO for having accepted that suggestion, and for arranging this Conference. And I think you would all wish me at this stage to express our thanks to FAO to their officers and all who have assisted them for the great amount of preparatory work which they have done to facilitate the discussions at this Conference. The background and other papers which they have commissioned and which were circulated well in advance of this meeting I am sure you will have found most valuable and informative and that they will do much to enable us at this meeting to concentrate on the problems which require special attention. As I read through these papers I could not help being struck by the very large number of people and agencies concerned with the production of fisheries statistics and the vast amount of effort devoted to it. Secondly I was struck by the fact that although broadly the production of statistics in each country has the same objectives there is considerable variation in the method of collection and compilation of the statistics and in the results achieved. That is of course understandable, since national statistical services have been evolved primarily to meet national needs and therefore reflected the special characteristics of national industries and their great variation from country to country. On to those national systems there has had to be grafted the requirements of the international organizations - as one of the papers puts it, the burden of reporting to international bodies. Our colleagues in administration and Ministries of Finance may perhaps sometimes regard these bodies as a voracious young cuckoo in the nest is regarded by its foster parents - with ever open mouths constantly demanding an ever increasing supply of food. But it is well to remember that the international bodies are creatures of our own creating and that the sole reason for their existence is to secure

the needs of the member countries. And while it may sometimes be difficult for members to supply information in standard form from available national statistics and even more difficult to meet entirely new demands, it is in their collective interest to do so. The nub of this problem we face, as I see it, is how these requirements can be met without putting an impossible burden on national systems. I believe that with good will we shall be able to find a way and if in the process we can each learn from the practices in other countries we may find that we are able to introduce improvements in our own national systems which to some extent at any rate may compensate for the new demands we must try to meet.

"I have been asked to say one or two more general things about the meeting and the method of procedure. What I have to say is really contained in the document you all have, "Prospectus and Program" - Estana/3, but it may be useful if I draw special attention to certain points. First of all the main aims of this Conference, which are dealt with in pages 1 and 2 of the document, may be briefly summarised in this way:- firstly to examine the use made of fishery statistics of all kinds, and to consider the requirements of all those who have occasion to use them; secondly to bring to light the chief difficulties encountered in compiling the statistics necessary to fulfil those requirements and compiling them in time to be useful; thirdly to consider how those difficulties can be overcome; and fourthly to consider in what other ways fisheries statistics can be further improved. The Conference is a technical meeting, because it was thought that technical experts would be the better able to concentrate on exposing current deficiencies and difficulties in the provision of fishery statistics, for those who require them, and revising solutions to the problems which exist. And being a technical meeting what we say or agree at this Conference does not commit the Governments to which we belong or any other bodies. At the same time it is hoped that in our deliberations we shall all bear in mind the practical considerations which govern the collection of statistics in our countries so that the conclusions we reach may have a better chance of acceptance by Governments and other concerned. I do not mean this in any negative sense. For as I said earlier the requirements of the international bodies reflect the considered views of the member countries. The subject matter of the Conference covers statistics for primary production, that is fishing industries statistics, statistics of the secondary and tertiary phases, that is processing and distribution, and also consumption statistics; that is to say all phases in the treatment of fish from the moment when it is extracted from its natural environment until the final stage of utilisation. The scope of the material thus covered by the Conference is, therefore, enormous, and if detailed attention were to be given to every aspect it would take far longer than the time at our disposal. It is proposed, therefore, that we should concentrate in our work on those problems and other aspects of statistics which seem <u>prima facie</u> to require attention and to arrive wherever possible at agreed recommendations for action at national or international level. In some cases it may be found that we cannot do so without further investigation over a longer period, and it may be that we shall have to make some recommendations to that effect. Perhaps we may find that there will have to be other similar conferences after this one. I hope that it will be possible to reach general agreement on our conclusions and that we shall be able, therefore, to dispense with such formalities as voting, etc.

"You will have seen from the program that it is proposed to set up two committees, one to deal with fishing industry statistics, and the other to deal with processing, distribution and consumption statistics. I hope you will agree that this is a sensible arrangement to enable us to cover the ground more quickly. We shall come in due course to the detailed remit of the two committees, but broadly it is suggested that each committee should be asked to consider in relation to their respective spheres items 6 and 7 of the outline Agenda on page 7 of Estana/3. Item 5, that is to say the requirements for fishery statistics is more general and covers the field of both committees and can perhaps best be dealt with in plenary sessions"

1.2.4 PROGRAM AND AGENDA

15. After these opening remarks the Chairman drew attention to the Agenda and Program. He asked for the adoption of the proposed Agenda and of the plan to set up the two working committees, to deal with items 6 and 7 of the Agenda. These proposals were accepted by the Meeting and the following Agenda was formally adopted:-

(1) Opening of meeting
(2) Election of Chairman and other officers
(3) Adoption of Agenda
(4) Organization of work
(5) Requirements for fishery statistics
(6) Difficulties in meeting high priority requirements and their solution
(7) Further improvement in fishery statistics
(8) Adoption of report and recommendations
(9) Any other business

16. The Chairman then called for nominations for two Vice-Chairmen for the Meeting, who would undertake the chairmanships of Committees I and II respectively. Mr. J.B. Rutherford (Canada) was elected for Committee I - proposed Mr. H.H.A. Whitworth (U.K.), seconded Mr. S.N. Sørensen (Denmark). Drs. D.J. van Dijk (Netherlands) was elected for Committee II - proposed Mr. E.A. Power (U.S.A.), seconded Dr. M. Rauterberg (Germany). Mr. J.A. Gulland (U.K.) was appointed rapporteur for Committee I and Mr. W. Ros (Netherlands) for Committee II.

17. The detailed program for the Meeting was then considered. It was agreed that item 5 of the Agenda "Requirements for fishery statistics" should be dealt with in plenary sessions, while most of the subject matters under items 6 and 7 should be handled, as appropriate, by the two main committees. It was further agreed that, because of the very wide range of problems facing the Meeting, and of the urgent need for solutions to many of them, attention under items 6 and 7 should be focussed on specific, priority topics. The topics selected, and their allocation to committee or plenary sessions are listed below:-

	Committee I	Committee II	Plenary
(1) Classification of statistical items	X	X	-
(2) Manpower statistics in the fishing industry	X	-	-
(3) Conversion factors	X	X	-

		Committee I	Committee II	Plenary
(4)	Incompleteness of coverage of statistics			
	(a) Statistics of discards	X	-	-
	(b) Treatment of foreign landings	X	X	-
	(c) Statistics of fishery activities outside normal commercial channels (sport and subsistence fishermen)	X	X	-
	(d) Loss of weight of fish during transport	X	X	-
(5)	Statistics of fishing effort	X	-	-
(6)	Statistics of processing			
	(a) At sea	X	X	-
	(b) Ashore	-	X	-
(7)	Statistics of distribution			
	(a) Domestic	-	X	-
	(b) Foreign trade	-	X	-
(8)	Statistics of consumption	-	X	-
(9)	Simplification of statistical reporting to international bodies	-	-	X
(10)	Price and value statistics	-	-	X

18. In considering most of the topics assigned to it, Committee II operated as a single unit, but for a detailed examination of each of its topics, Committee I set up an ad hoc working party. Ad hoc working parties were also set up to examine the two topics allocated to plenary sessions of the Meeting. A further ad hoc working party was set up, under item 5 of the Agenda, to consider the statistical requirements of fisheries economists.

19. The reports of the two Committees and all recommendations were reviewed by the Meeting in plenary sessions.

1.2.5 WORKING PAPERS AND DOCUMENTS

20. So as to provide the maximum time for technical discussion and the resolution of current problems, no contributions were formally presented by their authors during the proceedings of the Meeting. Instead, invited, written contributions, dealing with specific items of subject matter, provided the basic material for the discussions, and were referred to and used in the plenary and Committee proceedings. These fell into a series of Basic Working Papers, and Supplementary Working Papers respectively. In addition, various statistical and related publications, of relevance to the Meeting, formed a series of Background Papers for use

in the proceedings. The full list of these three series of papers is given in Annex D, and edited versions of the Basic Working Papers and Supplementary Working Papers, or abstracts from them, are included in the appropriate chapters of this report.

1.2.6 PARTICIPATION

21. Seventy participants and observers, from fourteen countries and six international organizations, interested in the statistics of fishery industries and commerce in the North Atlantic area, attended the Meeting in plenary session and at various sessions of the committees and working parties. The full list of names, positions and addresses of all participants and observers is given in Annex B. The officers of the Meeting are listed in Annex C.

1.2.7 TERMINATION OF THE MEETING

22. The Meeting concluded its business at 18.00 hours on Tuesday, 29 September 1959.

PART 2

THE USERS OF FISHERY STATISTICS

2.1 INTRODUCTORY REMARKS

1. The collection, compilation and publication of fishery statistics is not an end in itself, but the means to an end, which is to provide their principal users with the appropriate statistical tools for serving their respective functions. Therefore, an objective assessment of the adequacy of current statistics can only be made in the light of these functions. Consequently, the Meeting first set out to identify the principal categories of users, and determine the nature of their statistical needs.

2. The Meeting recognized that, although the users' functions and needs vary widely from time to time, place to place and within a national, international or professional regime, for the purpose of defining the different major types of statistical requirement, the principal users could be grouped conveniently into five categories, as follows:

   (a) Fishery administrators.

   (b) Businessmen and industrial organizations.

   (c) Fishery scientists (Biologists and Gear Technologists).

   (d) Economists.

   (e) Food Technologists.

   This grouping was therefore adopted for the treatment of item 5 of the Agenda.

3. In each industry phase, two operational processes are involved, the measurement of each of which is necessary for the proper understanding and evaluation of that phase, and of the industry as a whole. These processes consist of "inputs" and "outputs", measured either in physical or monetary terms. Most of the statistical requirements of the different users consist, therefore, of appropriate measures of either or both of these two processes. These differ according to the users' functions and interests, and the particular industry phases with which they are concerned.

2.2 STATISTICAL REQUIREMENTS OF FISHERY SCIENTISTS (ESPECIALLY FISHERY BIOLOGISTS)

2.2.1 GENERAL REMARKS

4. Attention was first paid to the functions and statistical requirements of fishery scientists since their assessments are at present the basis of international fishery regulations, and their requirements are the main concern of the ICES and ICNAF statistical offices. Further, they are concerned only with the statistics of the primary phase (fishing industry statistics).

5. These basic functions and requirements were outlined in document ESTANA WP/2 "The Use of Fishery Statistics by Research Biologists".

6. Relevant material was also contained in various of the Background Papers, especially BP/1, "Purposes and Methods in Fishery Statistics" (Report of the First International Meeting on Fishery Statistics held in Copenhagen, Denmark, 26 - 30 May, 1952). Excerpts from WP/2, and from "The Commercial Fishing Statistics Required for Research and Regulation of the North Sea Demersal Fisheries" by R.J.H. Beverton, published in the report of the 1952 meeting are presented in Section 2.2.2 (A) and (B) below.

2.2.2 CONTRIBUTIONS

7. A. "THE USE OF FISHERY STATISTICS BY RESEARCH BIOLOGISTS" (S.J. Holt) 1/

The Basic Needs for Fishery Assessment

In using commercial statistics, fisheries scientists are usually attempting to determine the relations of the various characteristics of landed product to the characteristics of the fishing activity, of the environment of the fish, and of the behaviour of the fish. Research with these aims usually makes much greater demands of precision and detail of statistics than other uses to which they are put; to this extent, fisheries scientists have usually taken the lead in requiring extension of statistical services and coverage, but it cannot be assumed, as has sometimes been done, that services which fulfil their requirements will automatically fulfil the main requirements of other users.

In considering the scientific requirements, and the means of meeting them, it must be borne in mind that as a need is recognized, special studies, often by sampling methods, are carried out to provide data of a certain kind; at a later date the collection of such data becomes incorporated within the routine statistical collection system. This process has occurred, or, in some areas, is occurring, with regard to breakdown of landings by species and by areas, and fishing effort indices. The research activities provide clues to the future demands on statistical services; present activities suggest, for example, future demands for landings breakdown by length of fish (within) a species category), routine measures of quantities and sizes of discarding fish (resulting from culling practices at sea), and statistics of searching time by units such as purse-seiners to provide measures of effective fishing effort.

We can also foresee an increase in requirements for supporting information concerning the fishing units, the operations of which are recorded in fishing effort statistics. Thus a detailed inventory of participating vessels, with information concerning their dimensions, propulsion, capacity, gear characteristics and ancillary equipment may be required for study to establish, for a particular fishery, standard and equivalent units of fishing power, and hence of fishing effort and intensity.

We refer to the establishment of existing relations between fish landings and the characteristics of fishing activity as the assessment of the fishery. Assessments of fisheries in which several types of fish are caught by a certain group of fishing units (mixed fisheries) are made on a species basis.

1/ FAO, Rome

The characteristics of landings which are normally considered are:

(a) The total annual weight of landings (sometimes it is necessary to consider numbers of fish as well as, or instead of, weight).

(b) The proportion of the catch which is landed.

(c) An index of fish "quality", such as the average size of fish in the catch.

(d) The partition of the catch between fishermen of different nations, or using different kinds of gear, or grouped in other socially and economically significant ways (inshore v. offshore; mechanized v. non-mechanized, etc).

(e) The average relative market values of fish of different species or sizes, in different places and times.

(f) The catches and landings, sub-divided as above, per unit of input (fishing effort).

(g) The annual and seasonal variation of the above characteristics; "Seasonal" may, of course, mean quarterly, monthly, weekly or daily, according to the type of fishery and the kind of problem it presents.

The characteristics of the fishing activity are of two kinds: those related to its amount (intensity) and those related to its selectivity (by species and by size of fish). The analysis of input statistics, especially for mixed fisheries, is made primarily to bring various crude measures of each of these two kinds of characteristics to common standard terms. To achieve this, a study is usually made of past statistics, and comparative fishing experiments are conducted to:

(a) identify groups of fishing units homogeneous with regard to their fishing power and the selectivity of their operations;

(b) measure relative fishing powers and selectivities as between units in different homogeneous groups;

(c) determine correlations between such measures and various measurable characteristics of the fishing unit, and, further, the causative relations;

(d) apply these results to the standardization of past and future statistics, particularly with regard to the elimination of trends in time series.

After practical steps have been taken, on the basis of scientific assessments, to modify a fishery, for example by regulation and licensing, it is necessary to follow events in the regulated fishery, and verify or modify the original predictions. Eventually it might be possible to establish for a given fishery a more or less "monitoring" system involving the collection and routine analysis of the minimum amount of data required to detect significant unexpected changes in the fishery - that is, in effect, to set up industrial control charts. Present indications are, however, that the initial period of testing general predications will be more protracted than some scientists and administration originally hoped. Furthermore, the demands made of statistical evidence during that period will be very exacting indeed, partly because we may be attempting to verify in say two or five years a prediction based on an evaluation of statistics relating to the previous twenty or fifty years.

We conclude, therefore, that statistical requirements listed now represent a minimum requirement at least for some years.

Assessments, though made at present chiefly with regulation of one kind or another in mind, will, it seems clear, increasingly be concerned with the effects of human intervention in the resources, by transplantation of fish, control of predators, breeding, fertilization, and so on. This will be particularly true once regulation of the major fisheries has been successfully accomplished, and we may confidently predict that, again, the demand for statistical detail will increase.

Lastly it should be mentioned that statistics of fishing operations are needed directly for the control of regulated fisheries; they need to be sufficiently detailed for critical study if situations are to be avoided whereby, because of unrecorded changes in the fishing activity, results of enforcing a regulation as formulated, are not as originally intended.

Similar considerations apply also to studies of the relation of abundance, distribution, availability and other aspects of fish behaviour to the environmental conditions. Such studies are made with a view to making predictions which might improve the day-to-day efficiency of fishing operations, permit prior adjustment of handling, processing and marketing facilities to cope with natural variations in supply, or lead to advanced rational policies for smooth changes in the industry to meet long-term changes in abundance or general distribution of certain species. If predictions are to help in the location of fish concentrations, the statistical need will usually be for promptness, and breakdown by very small areas and/or very small time intervals. Where, however, the main purpose is to predict very long-term trends, more emphasis will be given to continuity of statistics, and their comparability throughout the whole time period covered.

Statistical Requirements

The basis of all the studies outlined above is, I believe, the calculation of an index of relative abundance of a fish population and of its variation in time and space. The unit population (in the statistical sense) is usually defined as the fish of a certain species and of a certain size or age. Abundance can be measured by several methods, including egg-surveys and tagging, but all methods depend on the commercial statistics to a greater or lesser extent. The index normally used is the ratio of the catch obtained to the human effort expended in taking it, and attempts are made to define and calculate "effort" in such a way that that ratio is indeed a good (proportional) index of fish density. This may seem a circular argument, but I believe it is proving possible, by a proper combination of theoretical considerations, and of identification and subsequent measurement of individual factors which tend to bias the index, step by step to approach, for each fishery, a satisfactory, if not an ideal, index.

The necessary detail of catches and efforts may be obtained wholly by total census methods, wholly by sampling techniques, or, more usually, by a combination of both. In theory, an optimum allocation of statistical collection effort could be determined; in practice, we are a long way from being able to do this in most fisheries, largely because we still know little about either the magnitude or the significance of errors (both variation and bias) for the results of assessments.

Whatever the outcome of current studies of sampling systems, it has become appreciated in recent years that to make a valid assessment we must know something about everything concerning the fishery, and much about some things.

For example, suppose one stock is exploited by two fleets - one of trawlers, the other of seiners. Detailed catch and effort statistics for the trawlers may give good indices of abundance, but some measure of effort is needed also for the seiners. It may be sufficient to measure roughly their effort relative to that of the trawlers, and for certain purposes it may even be possible to estimate their effort from their catches. If this is to be done, however, it is necessary to know that the length compositions of the seiners' and trawlers' catches are the same (or, if different, exactly how different) and desirable to know the fishing area of the seiners in relation to that of the trawlers. In any case, the fishing effort of the trawlers may be estimated by different means than that for seiners; perhaps one by total census, the other by sampling or even by deduction from catch, but however they are estimated, estimates of both are needed. Again, if two fleets fishing a stock use gears having different selectivities, it is necessary to know the size compositions of the catches of both; one might, however, be determined from a comprehensive sampling and measuring system, the other by an analysis of market categories supported by spot sampling to check the size ranges of fish in each category.

With regard to measures of fishing effort and sizes composition it must be possible to add together the data from different parts of the whole fishery, especially from different countries. This is true, of course, of catches but here simple conversion from one system of units to another, from one condition of product to another, is the only operation involved. For size compositions, it is necessary to standardize the methods of fish measurement, of grouping the data, and of relating the length samples to entire catches or landings. For fishing effort it is necessary to be able to derive equivalent units of effort and to use these to compute converted statistics. A special problem here is that such computation has usually to be made from the original raw data. Thus there may be tabulations of effort in terms of "hours fishing"; if the fleet is heterogeneous with respect to vessel size, if the proportion of vessels of different sizes varies with time or place, and if it is found that fishing power varies systematically with vessel size, it may prove desirable to express effort in units such as "ton-hours fishing". In such a case the conversion could only approximately be made using the earlier tabulation and the average tonnage of vessels; proper use could only be made of the data by computing from the individual trip records.

From considerations such as the above, we may conclude that the basic scientific requirement is that there shall be available or computable statistics of catches and landings by species (and sometimes sub-divisions of species), by size of fish, by individual fishing operations (or groups of operations - "trips", for which the number of unit operations is known), by as small an area as it is possible to identify consistently, by date or by time periods not much longer than the duration of a group of successive operations. Some of this information will be obtained by special sampling, and for any particular fishery at a given time it will be useful to summarize this information by longer periods, or larger species groups and areas.

8. B. "THE COMMERCIAL FISHING STATISTICS REQUIRED FOR RESEARCH AND REGULATION OF THE NORTH SEA DEMERSAL FISHERIES" (R.J.H. Beverton) 1/

General Requirements

Perhaps the most fundamental application of catch and effort statistics is to the calculation of an index of abundance of fish. This factor is not only of general biological and economic interest; it is the basis for the estimation of mortality rates from age-composition data.

1/ Fisheries Laboratory, Lowestoft, United Kingdom.

Without a knowledge of them the effects of a fishery regulation can neither be predicted accurately in advance nor established conclusively from subsequent events.

Detailed Requirements

The ratio of the total annual catch of a species to the total annual effort on it (in terms of fishing time) can give a crude index of total abundance, or of the abundance of each age-group when the catch is sampled and broken down into its age-composition. This index, as it stands, is of limited application, and needs to be refined in three ways:

The first refinement is to express the effort data in a standard form. This requires that the fishing powers of various types and sizes of ships and their associated gears should be adjusted to a standard unit of fishing power; thereby the fishing time of individual ships can be summed to give a measure of total effort which is of comparative value. Such a unit must bear a simple relationship to fishing power if it is to be made the basis for the large-scale conversion of commercial statistics.

The second refinement concerns the delimitation of the areas to which the catch and effort data refer. The need for this arises from the fact that fish and fishing effort are never uniformly distributed over the whole fishing area, and a given total effort will catch more fish, and hence give the appearance of a greater total abundance, the more exactly it is concentrated where the fish is most abundant. It can be shown that in these circumstances the true index of abundance is obtained by summing the ratios of catch to effort for each unit sub-division of the whole area, provided no appreciable concentrations of fish remain entirely unfished for any length of time. The larger the number of sub-areas into which a given total fishing area can be divided, and hence the larger the number of individual catch to effort ratios which can be computed and summed, the better the estimate of total abundance becomes. In other words, for fishing effort to be related to the fishing mortality rate which it causes, it must first be expressed as a fishing intensity, i.e. its concentration in space must be defined, and then weighted according to the density of fish. In practice, the accuracy with which the fishing positions of individual ships can be recorded sets a lower limit to the size of each sub-area. Analysis of English statistics has shown that for demersal fish the size of a statistical rectangle (roughly 30 x 30 miles in the North Sea) is a reasonable compromise between the accuracy of the commercial data and the theoretical requirements: certainly, any larger sub-area would be of much less value.

The third refinement is the time grouping of the data. In order to compute an index of abundance in the way it is necessary that no great changes in the distribution of fish or effort should occur during the periods for which the ratios of these quantities are computed. Owing to the tendency of fish to undertake seasonal migrations for purposes of feeding and spawning, and for the distribution of effort to vary seasonally in response, a whole year is too large a time unit. Again, with regard to practical limitations, it would seem that a month is the smallest time interval that need be used for demersal fisheries.

Collection, Analysis and Presentation

The main need is for data of catch and effort to be recorded for an individual trip of a vessel as the basic unit of information. Then the assignment of the effort and catch by species of each trip to a statistical rectangle, and the recording of the details of the vessel needed to convert that effort to standard units, presents no major obstacle. Even if all trip records could not be regularly worked up, they could be sampled to give specific information with sufficient accuracy. Indeed, the whole question of the application of modern sampling techniques not only to the analysis but also to the collection of

commercial statistics is worthy of consideration. Published commercial statistics present the somewhat anomalous situation of giving certain information, such as total annual catch, with a relatively extreme and, for some purposes, unnecessary degree of accuracy, while other equally vital information is lacking altogether.

In the long-term view, presentation of detailed commercial statistics of each country in the form of monthly charts, giving the catch by species and the standardized effort for each statistical rectangle, should probably be regarded as the ultimate objective. It may well be that the analysis of the trip records of each country for this purpose and the preparation of monthly charts are all functions best performed centrally by an organization which has access to an automatic sorting system. This would leave each country responsible for the collection of its own statistics, and for preparing and sending forward the coded trip records in such a form that they would only need the minimum of further attention before being fed to the sorting machines. But, in return, each country would be relieved of the greater part of the task of sorting trip records. The collection and prompt dissemination of information, of the necessary detail and in a standard form, is of the greatest importance and this applies to research data resulting from fish population studies no less than to commercial fishing statistics.

2.2.3 CONCLUSIONS

9. After detailed discussion of the Fishery Scientists' needs in the light of the information contained in these documents, the Meeting agreed that their requirements can be defined broadly as follows:

(a) Statistics of output in terms of the size and composition of the gross catch of each species (or group of species) exploited in the fishery.

(b) Statistics of input in terms of the kind (selectivity) and amount of effective effort expended by the fishery.

10. These statistics are required in suitable units and with sufficient time and area breakdown and accuracy for the estimation of reliable indices of abundance of the exploited fish stocks.

11. The current difficulties in fulfilling these requirements and the question of the timeliness in reporting them were referred to Committee 1 for more detailed consideration under Agenda items 6 and 7.

12. Consideration was also given to the statistical requirements of Gear Technologists in the light of material contained in document SP/8, "The Statistical Needs of the designer of large trawlers and ship-borne processing plants". The Meeting agreed that, while for some investigations, detailed and specific catch and effort data may be required (especially with regard to the assessment of catching rates), so far as international statistics reporting is concerned, their requirements can be broadly identified with those of fishery biologists.

2.3 STATISTICAL REQUIREMENTS OF FISHERY ECONOMISTS

2.3.1 GENERAL REMARKS

13. Whereas fishery scientists are concerned with physical measures of inputs and outputs of the primary phase, fishery economists work not only with these measures, but also, and primarily, with their monetary equivalents. Further, their interests are not usually confined to the primary phase, but extend to all phases, and to the industry as a whole. In consequence, their demands on statistical material are wider in scope, more diverse and, in general, more difficult to meet at the international level than those of fishery scientists. Furthermore, the economist's incursion into the fisheries field has hitherto been of limited extent with the result that their working concepts are less well defined and publicised than are those of fishery scientists. These basic concepts, and the main statistical requirements of research economists were dealt with in document WP/3, "The Use of Fishery Statistics by Research Economists", presented below in Section 2.3.2 (A), while material of a more general economic relevance was contained in documents WP/4, WP/5 and WP/6, dealing with the use of fishery statistics in business and government 1/.

2.3.2 CONTRIBUTIONS

14. A. "THE USE OF FISHERY STATISTICS BY RESEARCH ECONOMISTS" (A. Scott) 2/

Introduction

Economists have not progressed far in their study, or understanding, of the fishing industry. It is true that the needs of regulatory bodies and the research requirements of scientists have resulted in the production of some comprehensive fisheries statistical series. It is also true that general statistical-collection bodies have obtained census information which is roughly analogous to that obtained from agriculture or manufacturing. But the former needs are not the same as those of economists; and the latter method often suffers by assuming that exactly the same questions can be asked of all sectors of the economy.

What questions bring the economist to the fishery?

(a) The efficiency of the fishery. How productively does this industry utilize inputs such as labour, capital and supplies?

(b) The input-output connections of the fishery with later stages of fish distribution and marketing, and with other industries. This comprehends also the comparison of the fishery with other industries as to size, employment, income, etc.

1/ See Section 2.5.

2/ Department of Economics, University of British Columbia, Canada.

The author of the paper was faced with the difficulty that "research economists", by their nature, cannot be characterized as working for long within any particular field of fisheries statistics. Rather than catalogue every conceivable need that might arise in the future, he has confined himself to the two matters mentioned above, which do at least provide examples of some fairly difficult problems of economic analysis that are unlikely to be covered in the other working papers available to the Committees of the conference.

The Need for Measuring the Costs of Fishing

"Efficiency" has many meanings in the sciences and arts connected with fishing. Engineers often refer to the technological efficiency of gear, and have measurements by which they indicate the volume of fish which can be caught in a time period by each kind of gear. Their measurement is intended to ignore the value (though it may distinguish between species and between weights, sizes or ages) of fish caught, and also to ignore the financial cost of each kind of gear. The same purpose is served therefore as such familiar technological ratios as an automobile's "miles per gallon", a university's "students per teacher", or a factory's "output (of a certain product) per hour".

These measurements are essentially a ratio between an input and an output. They have commercial and economical use only if the numerator and denominator have a constant value per unit, and if the numerator and denominator are the essential "key" measures of cost and revenue from operations. Usually, these conditions are not satisfied, which is why motorists do not insist on maximum miles per gallon, but look for other desiderata of efficiency as well, and factories do not maximize output per hour regardless of changing cost per hour.

Reflection on the inadequacy of such ratios as indicators of economic performance brings us to the realization that we need a measurement which takes account of all the costs of inputs and all the revenues from output. It is realized that not all costs are money expenses, and not all revenues are cash receipts: there are intangible personal and social costs and gains as well. But the effort should be made to quantify as much of the total cost of and total gain from fishing as possible, and to postpone the consideration of intangible items till later.

All inputs can be summed only if they are put into common denominator terms: measurement in money units - similarly with gains. Throughout the economy operators are buying the services of labour, gear, and supplies with money, and selling their products for money. When cash transactions do not enter, the operator cannot know how well he is doing unless he estimates the cash amount (obtainable in other employments) he is sacrificing in contributing his own time and effort and the cash amount he might earn if he were to sell his product, instead of using it himself or giving it in trade for other goods. Thus, in any industry, the individual proprietor needs a money measurement of the value of his input and product (or output).

And so does the economist who examines the fishing industry in relationship to the whole of society. The values of the supplies, gear and labour used in fishing are indicators of the value such inputs might produce for society if they were used elsewhere (after allowing some time for the economy to accommodate the shift of the inputs to other uses). That is, money costs to the fishing industry, if they include all the inputs which could be paid for, are also a measure of the cost to society of allocating those inputs from other potential uses to producing fish.

Similarly, the economist views the revenue which is or might be obtained from the sale of the fish as a measurement of the value to society of the activity in the fishing industry for a period of time.

It can be seen, therefore, that there is little to be gained for the economist from the efforts of biologists and regulatory agencies to convert various types of effort into units that are standardized in terms of their effect on the fish population. This conversion is primarily useful in estimating the size and distribution of the fish population. The economist's question, being different, does not call for this standardization of effort units, but rather conversion of all inputs into terms that indicate their (the input's) usefulness in other sectors of the economy These terms should be money.

The point must be stressed. In the early days of fishery investigation, the available data were useful to both economist and biologist, because technical progress was slow, so that the vessel or man-hour was a good index of both fishing effort or of cost of input, the significance of which did not change greatly from year to year. Hence, relative to the general ignorance of both the population and economic characteristics of the fishery, enormous research progress could be made using statistics which had some usefulness in measuring both pressure of fishing and cost of fishing. But technical progress is nowadays very rapid, and to the economist progress is practically synonymous with an increase in efficiency. This, in turn, implies an increase in the output possible with a certain input. It may manifest itself in the fishery either as a reduced cost of a given catch or an increased catch for a given cost (population remaining substantially the same in both cases). Clearly, to determine what is happening to efficiency from the economist's point of view, it is necessary to know the cost of the inputs used, and not the fish-population-reducing potential of those inputs. It is therefore necessary to provide data for the economist which are not necessarily useful at all for the biologist.

Examples of Cost Statistics

Consequently, the economist welcomes the efforts of many governments to produce statistics which can be used to measure costs.

Information on equipment, for example, should indicate for which types of fish the equipment is suitable, the year in which the equipment was purchased or made, its original cost (not someone's estimate of its replacement cost), and the annual amounts necessary for repair and maintenance. If the price level is rising so that replacement value exceeds original cost, adjustments and calculations of the extent of the increase should be made centrally, or by the outside economist, not by the respondent or the enumerator.

Information on supplies, such as fuel, ice, bait, lubricants, on food and on other expenses should also be obtained, at cost to the vessel.

Such information is sometimes obtained by sample surveys, and by various indirect measurements (sales of nets by suppliers, for example). It is not the task of this paper to suggest new sources of information, but it seems, from an examination of the sources used by governments, that not enough use has been made of the crew settlement form. It is impressive to observe that countries are obtaining more and more information from the sales slip. Until the slip began to be extensively used for statistical information, many transactions were made at ports without formal or uniform invoices. Would it not be possible for governments to supply detailed crew-settlement forms, in duplicate or triplicate? One copy (to be sent to the government) would show the expenses of the vessel during the season or on the trip. It might be

possible in this way to obtain complete monthly or annual information on the outlays and costs of the fleet.

The economist needs the same information on labour used. Here, however, difficulties arise when money measurement is attempted. On the one hand, labour is commonly paid on a share system (or modification of it). Consequently, the amount received by labour may be a better indication of fishermen's fortune than of the real cost of manning the vessel. And on the other hand the isolation of a fishery from other industries may make it impossible to estimate locally the alternative earnings of the labour used in the fishery if it were employed elsewhere in the economy.

In these difficulties, the next-best to money measurement is labour measurement. Here it is necessary to find, basically, the amount of labour time contributed to the catching of each kind of fish, or on each fishery, if several species are caught simultaneously. It may be helpful to develop an analogy here. In examining manufacturing, the inquiring economist obtains for a certain industry the number of men, their hours of work, their time off in holidays and sickness, and their division among categories such as clerical, skilled, semi-skilled, unskilled. With this information he computes the hours of work put in during a year by each relevant kind of labour, compares it to the value of output, and obtains a measure of output per man-hour.

The fishing industry should be studied in a similar way. The economist wants to know how long each man puts in at shore work (in repairs, for example), and at sea. Thus vessel-hours, or number of hooks or skates are not the required information: what is required is man-hours. Further, the men should be classified as to their skill, or at least as to their age. This latter would give some indication of how many men are committed to the fishing industry.

Much of this information could be supplied either on the sales slip for a certain voyage or on the crew settlement for a voyage or season. But to the economist, work in port in repair or maintenance is just as important a cost as work at sea. Hence it is probably necessary to examine the labour force itself, ashore. This may be done periodically, since it is not to be expected that the need for maintenance or for shore work will change greatly in proportion to employment at sea. Further, it may be done via a sample survey. 1/

However the information is obtained, the economist wishes to know the hours of work in the fishery, ashore or afloat, and his income from his work. He also wishes to know the time spent in each other occupation, and income from each. In order to analyse the alternative employments, it is useful to know his age and skill. A related problem can be illuminated if the data cover the mobility of the worker from year to year: where was the man working last year? how long has he been in the fishery?

It should not need stressing that the economist cannot make intelligent use of statistics tabulated under headings as vague as Total Number of Persons Engaged, or as imprecise as "primarily fishermen", "occasionally fishermen", etc.

The economist, to understand the fitting-in of fishing with other employments, must know at what time of the year the worker is fishing. The "cost" to

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1/ A recent useful example is D.R. Buchanan and B.A. Campbell, The Incomes of Salmon Fishermen in British Columbia, Ottawa, Canada, 1957.

society of using the man's time differs from season to season, depending on the opportunities to work elsewhere. Similarly, the possibility of using vessels and equipment in other fisheries varies from season to season. For these reasons there is a great deal to be said for presenting information of the kind discussed here on a monthly basis.

If such information is available, the economist can synthetize estimates of the real cost of using manpower in fishing.

Output and Cost Related

It is then necessary to juxtapose this "input" information, whether measured in labour hours or in dollars, and the related "output", or product, information. The output statistics presently available are much more useful, presumably because the receipt-slip system produces a good deal of landings data. Weight statistics, by themselves, are nearly useless, since a ton of herring and a ton of salmon are not economic equivalents. But accurate measurements of landed values, for each fishery, are useful. The point to aim for is not some estimate of what the landed value should be, but what it would be if fish were sold in some open sale or market to willing buyers.

The landings should be classified into the same groups as inputs. It is obviously impossible to compute either engineering efficiency or economic efficiency unless the inputs are identified with the production of certain outputs. Thus, if labour and equipment are classified by type or by port, the landings must be classified to show the catch of those vessels and those men. Nor is the economist interested, for efficiency measurement sake, in the analysis of the catch by species. It is value that interests him, though his tracing of the catch through other parts of the economy may require information on species, weights, and so forth. (The economist, of course, is interested in knowing why the value of the catch per money unit of input increased, and the explanation may be that the species caught changed from a low-value one to a high-value one.)

It is not strictly necessary that information be obtained from individual fishermen about interest and depreciation. Some will not be paying interest, some will. The amount allowed as depreciation is often a matter of income-tax regulation rather than a measure of the fall in value of capital goods. If information has been obtained on type of vessel and equipment, age, and original cost, the economist can make an estimate of interest and depreciation from the aggregate figures for each fishery. This kind of study can be assisted by periodic (not annual) surveys of the sources of funds for vessels and gear, and the life of each kind of equipment. A sample survey may be adequate for this type of information.

When the value of the catch (landings) has subtracted from it the cost of supplies, an estimate of interest and depreciation, and the cost of repair and maintenance, the remainder is an estimate of net value of production.

It goes without saying that the landings information for the purpose of computing efficiency, should not be "standardized". If, for example, some fish are landed heads-off, and some in the same fishery are not, then the total selling value of the two types is a measure of the value of the catch. The data should not, for economic analysis, be adjusted to produce instead an estimate of the round-weight value of the whole catch.

In the same way, locational information should be left as specific as possible. The performance of a particular fishery must be related to the inputs of labour and capital on it; hence the analyst is blocked if he is unable to determine where fishing actually took place. Even more important, it is necessary to know where fish are landed. One of the consequences of regulation of fisheries is believed to be a migration of the port facilities toward the fishing ground. Unless the landings at each port are related to the fishery from which the fish were taken, it is impossible to characterize the economic and social characteristics of the various methods of fisheries regulation.

Using the Cost and Value Estimates

Such information as has been mentioned here can then be used to study whether the net value of output per money unit of input is increasing; failing that, whether the value of output per money unit of gear and capital is increasing, and whether the catch per unit of labour is increasing. The change in these ratios for each month, year by year, can indicate:

(a) whether the economic efficiency within the industry is improving, and leadsto studies to explain the change;

(b) whether the fishing industry is using its inputs of labour and capital efficiently as other industries in which the same inputs might gradually be absorbed;

(c) which of several ways of regulating the industry according to political or biological criteria would be the most efficient from both points of view immediately above;

(d) the extent to which effort applied to a particular area or species might be limited in order to obtain for total labour and capital used in the industry the same incremental return that such labour and capital could yield if utilized elsewhere (i.e. in order to obtain the economic optimum for efficient fisheries' utilization).

There have been studies made in many countries of the economic characteristics of alternative systems of fishing. In Canada one thinks of the excellent research by Proskie and others of the "Operations of Modern Long-Liners and Draggers -- Atlantic Seaboard", and of the Buchanan and Campbell study of the salmon industry on the Pacific Coast. Based on sample surveys, these studies are difficult to utilize as a basis for continuing examination unless the studies themselves are prolonged. It would, for continuing research, be more useful to the economist to have the cost and input statistics on labour and capital collected universally and continuously. Then the data could be used for a variety of studies, oriented to labour-management dispute settlement, methods of fishery regulation, characteristics of new gear, labour mobility in the whole economy, problems of financing, community development in ports, and so forth. As things are, the survey results of researchers are very difficult to apply to problems other than those addressed by the particular researcher.

The labour-management (or fisherman-owner-dealer) field in particular requires the production of continuing estimates of input-output ratios. Single-period studies, valuable as they are, make it very difficult to compare the trends in income of fishermen with their "productivity" and with the incomes and productivity of workers in allied or alternative occupations. Annual or monthly input and output data, classified by fishery, port, and type of gear would make it possible not only to study these matters, but also for the claims of contending parties to become more "realistic", or "responsible".

Further, the resultant information on average net returns and incomes per man (instead of rumours about the luck of the most successful fishermen) would have some effect in reducing the excessive labour and capital supplies in developed fisheries. Finally, as already suggested, methods of regulation, either in the interest of preventing biological depletion or of achieving the most efficient economic use of the fishery, may be compared and examined so that any given objective of fisheries' policy may be pursued with as much precision as fishing will ever allow. Economists generally argue that the supply of labour and capital in developed fisheries should be reduced until the contribution to the net value of the fishery by the least efficient vessel and crew is no less than the contribution such labour and capital could make if worked into the production of other goods and services elsewhere in the economy. To achieve this end, however, the policy-maker and the economist must have more than today's information about the quantity of labour and capital being applied to each fishery that is capable of being treated as a unit, and also about whether the contribution made by such labour and capital (at the margin) is actually far below what they could contribute elsewhere.

The problem of regulation is complicated by the fact that labour and capital in many of the world's fisheries come from several different economies. If the economies are very different, clashes of interest are likely to appear. It is a difficult political question to answer how, in principle, the regulation of such fisheries ought to be developed; and the economists' answer to the question is not by any means fully worked out. (For a discussion of the principles involved when only one country harvests a fishery see essays by Turvey, Scott, Gerhardsen and others in Economics of Fisheries; for a survey of the international fishery, see Scott Gordon, "Obstacles to Agreement on Control in the Fishing Industry", and the "Discussion" following it, in the same volume.) In general, countries with low standards of living and labour costs may find it economical to utilize a fishery intensively, for fish may be valuable and labour plentiful. Other countries harvesting the same population might, independently, wish to catch fewer fish, since labour is expensive and fish relatively less valuable. If there is to be international control, two decisions must be made:

(a) to decide on the intensity of fishing pressure to be applied to the fish population in question, since the two countries, left alone, would make different decisions;

(b) to decide on the proportion of the regulated effort, or permissible catch, to be allocated to each country.

The economist can produce no clear-cut rules by which it would be desirable to resolve these questions. However, at this stage it does appear clear that those who must settle the matter, by politics or by diplomacy, can make better decisions if they have information on the cost of labour and capital inputs in the two countries and on the divergent values of the fish (if there are trade barriers) than if they proceed on the basis that "effort is effort" no matter which nation expends it.

Inputs and Outputs of Connected Industries

We turn now to the relationship of primary fishing to all other industries. In studying the whole fishing, port, packing and distribution chain, it is necessary to establish how much value is "added" at each stage. On the one hand it is necessary to know what inputs each stage buys; these comprise labour (labour-hours again, by month of the year), capital goods (by original cost, age, number and type) (also whether the capital goods such as trucks and other mobile equipment can be put to other uses during the off-season for fishing); supplies such as fuel, power, light, packing materials, etc.;

and the purchase of the raw fish. The purchase price of the raw fish should correspond exactly to the landings value obtained in the fishery. If, for example, some fish is sold fresh off the dock for home consumption, an estimate of these proceeds should be available. Often there is a disparity between landings, measured in volume or in value, and the fish inputs or purchases of processors or dealers. The economist, in no position to explain the disparity, all too often gives up the attempt to trace the product to its final market. Yet the statistician is frequently in a position to reconcile the estimates.

An illustration of the problem is to be found in the "flow-charts" of fish catching and distribution in Ralph Cassady, Jr., "Marketing of Fishery Products in the United States" 1/, or in Otto Bauer, "Statistics on Marketing and Processing of Sea Fish in Western Germany" 2/. Dr. Cassady was apparently quite unable to put figures to most of the various flows and arrows in his chart, and Dr. Bauer was able to provide only partial information. The final demand, and hence the market for and value of the fishery cannot be understood until it is known what proportion of the catch passes down each channel. The information on the amount reaching and passing through each level of the chart should be collected and published in such a way that the sales by, or flow from, all establishments at one level is equal to the purchase of or flow to all establishments at the next level.

The economist also wishes to collect the other costs at each of these levels: their purchase of light, heat, power, materials, chemicals and investment. Such information is sometimes already available from the censuses of manufacturing or of distribution made by many countries. But it cannot be used unless we know how much of the catch flows into each part of the manufacturing and marketing network. This comprehensiveness may appear to be an unreasonable demand from the economist. If so, the reader should realize that it already is possible to obtain such information, and much more, for agriculture in each country. Agricultural economists have available as well price quotations on a daily or weekly basis on most crops or foods at each level, and on inventory stocks held at each level each season. Inventories are important in two ways:-

(a) to indicate the stock-holding function performed by firms at each level of the distribution network, and

(b) to indicate the changing importance of stocks as fisheries regulations change the length of the fishing season and force dealers to hold the stock for a compensatingly different period.

With information such as this, the economist can examine the efficiency of each stage in the whole fish industry. He can then compare the performance of the various stages with each other, with themselves in different years (to get a picture of the productivity trends), and with similar industries in other parts of the economy.

The economist, it can be seen, does not regard the fishery as of interest in itself but as an industry, serving needs also served by other industries and using supplies and inputs also useful to other industries. This concept of an industry has been formalized by the Leontief-type input-output analysis of the whole economy.

1/ Turvey and Wiseman, eds., The Economics of Fisheries, p. 185.

2/ Purposes and Methods in Fishery Statistics, pp. 173 - 183, FAO, Rome, Italy.

Less formal analyses of the place of fishing in the whole economy merely measure what proportion of the whole labour force, what proportion of horse-power available, what share of the capital stock, and what share of final consumer and export demand are employed in or supplied by the fish industries. While such measurements are useful and can provide many insights, they are most impressive when they are fitted into an input-output table of the entire economy. To complete this table, the economist needs to know for each industry of the economy how much it buys from or sells to the fishing industry, and for the fishing industry as well how much it spends on direct inputs like labour, enterprise (profit payment), capital (interest and depreciation) and taxes. In the past, it has proved notoriously difficult to obtain this information, with the result that fishing has been lumped in with farming or with other primary industries in a way which casts little or no light on its role in trading with other industries. Until fishing, fish-processing and fish-distributing are as firmly measured and classified as already in agriculture, particularly with respect to purchases and use of labour and capital, it is bound to remain a rather murky and unknown part of the economy.

A useful by-product of a statistical system in which there is fairly complete knowledge of the disposal of the fish catch is that consumption can be quite accurately determined, as a residual, and checked against retail sales information and against family-budget surveys. To do so would be very valuable, since it is not now possible to make useful market surveys and studies for fish when per-capita consumption data are so unreliable.

Just as fishing must fit into an inter-industry framework, to be fully understood, so it must fit into international trade statistics. The main problem here is, of course, to be sure that trade and tariff classifications are similar to those used in domestic and foreign industries, so that flows of fish from one country to another can be accurately identified with the consumption statistics and fishing statistics of the importing and exporting nations. Even then the fish may be "lost" since detailed study of a fishery requires knowledge of whether fish is being sold in the same market from many countries, or if each country's produce goes to a specialized market.

This problem is especially important if, as is often the case in North America, fish from a single fishery are caught by vessels of several nations and then sold into a single market. In analyzing this kind of situation, the economist wishes to know not merely that fish went to the United States or to "Europe" but to what part of those countries; similarly he wishes to know more than that fish came from Canada, but whether it came from the west coast, the lakes or the east coast fishery.

The previous discussions of fishery statistics suggest that this international problem has been discussed many times before, and that little can be added here that will be useful 1/.

/To the statistician interested in setting up fisheries information in the form useful for input-output studies, it may be suggested that the establishment may not be the most appropriate basis for information collection. Certainly in some fisheries the establishment, the vessel and the firm all coincide. But in others it may be possible to obtain much more information if the integrated nature of some "industrial" fisheries is recognized, and

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1/ See Chapter 6, Purposes and Methods in Fishery Statistics, "Fishery Products in External Trade Statistics", containing contributions by Messrs. Gertenbach and Leonard respectively.

information is collected from the firm, to comprehend its data on catch by its own vessels, processing in its own plants and distribution through its own channels. It appears that much information is now lost by insisting on data collection on an establishment basis or not at all. As well, using the firm (or "enterprise") basis might make it easier to handle the increasing number of auxiliary vessels that are hard to classify: factory ships, collectors, packers, and others that are likely to appear in the near future. We believe that much German and French information is already collected on an enterprise basis: see, for example, the paper by Hass on Western Germany in Purposes and Methods in Fishery Statistics, p. 108, and by Bauer, p. 299./

Conclusions

The purpose of the writer of this paper has been to emphasize two points:

(a) If the economist is to pursue his interest in studying the efficient use of labour and capital in the fishery, he will need a great deal more information than he now has on time and intensity of labour use, on capital costs and on expenses.

(b) If the economist is to participate in the examination of the role of the fishing industries in the whole economy, and the inter-relatedness of the various fishing industries, he will need information on quantities, values and costs at each stage in the transactions between vessels, dealers, processors and distributors. In this respect the fishery falls far behind agriculture in the quantity and quality of information that is available, and this shortfall is in part revealed by the gulf between the intensive economic study of farming and the relative neglect of fishing and the fish-based industries.

2.3.3 PROCEEDINGS

15. After a lengthy discussion of the current and future functions of economists in national and international fisheries work, the types of technical problems with which they are faced and the nature of their statistical requirements, the Meeting set up and ad hoc working party to examine the problem in more detail and specify the basic requirements in this field, especially at the international level.

16. The working party subsequently reported back to the Meeting in the following terms:

"The working party considered that its task was (a) to identify what necessity there was for internationally comparable economic statistics in respect of fisheries, and (b) to recommend the particular economic statistics that might be collected to meet this necessity. It suggests that the Meeting report on these matters as follows:

(i) International Commission for Northwest Atlantic Fisheries. In order to obtain its objective of "maintaining stocks" and "keeping stocks at a level that would permit the maximum sustained catch", ICNAF may recommend one or more of 5 types of measures: declaring open and closed seasons; closing sub-area; limiting size; limiting gear; and limiting catch. These recommendations are to be made upon the basis of "scientific investigations" (Article VII), and presumably on the use of "statistical, scientific and other information.." mentioned in Article VI.

These items have already been interpreted in such a way as to lead ICNAF in 1952 to request governments to provide economic and other information which would tend to supplement catch information. In addition, at the 1957 FAO/ICNAF/ICES meetings in Lisbon, attention was specifically drawn to the relevance of economic information in considering fisheries problems.

(ii) Northeast Atlantic Fisheries Commission. Under the Convention concluded in January 1959 (but not yet in force) the Commission when established will be empowered to make recommendation of 5 types: gear regulation; size limitation; closed seasons; closed areas; measures for the improvement and increase of marine resources. In addition the Commission could be empowered if all member Governments agree, to make recommendations on the regulation of total catch or fishing effort.

(iii) Permanent Commission. Under the Convention of 1946 the Commission may make regulations of mesh size and size of fish. Although questions of an economic nature often enter into the Commission's discussions so far it has been able to obtain information of this character on an ad hoc basis.

(iv) International Council for the Exploration of the Sea. Among its other duties, ICES has the responsibility of advising the Commissions of the 1946 Convention, and of the future 1959 Convention, on various aspects of their management problems.

(v) The Meeting concludes that the international bodies have already sought economic information and statistics, and have obtained them in an ad hoc fashion. Further, the choice among alternative measures for the control and conservation of fisheries, may in the final analysis be determined by economic considerations. The international bodies concerned may therefore find it of assistance to have available statistics which facilitate the evaluation of the economic impact of each type of measure and the extent to which it is used, on each country and on all countries together.

(vi) In view of this and of other recent developments it can perhaps be expected that the demand for economic information in respect of fisheries will grow. Such demands cannot be fulfilled unless there is adequate time to prepare and the meeting therefore recommends that the international bodies concerned should give early consideration to their likely requirements in this field and to state them as fully as possible.

The Meeting recognized that economic information cannot by itself solve the problems with which the international bodies are confronted, but was of the opinion that it can usefully supplement other information including biological data, in providing a basis from which agreement on management measures and the methods of their implementation can be reached.

(vii) The Meeting, being aware that new statistics are expensive to obtain and publish, attempted to outline the minimum statistical requirements that would enable competent experts to assess the economic effects of management measures and methods in international fisheries. It made an effort to define these requirements so that they could be met largely by extension or modification of statistical information already provided or planned for other purposes or from periodic censuses or surveys.

(viii) In setting forth the requirements, the Meeting stresses that all information, both for economic outputs and for inputs, must, to be useful, be specified as to area or fishery and time. This will enable the specialist to relate output values to the manpower, capital and other inputs corresponding to them, and so obtain indications of the economic effects of various management methods.

(ix) On the output side, the essential information is data on products landed, including processed products and by-products by quantity and value, consistently defined. If possible, the value should be that actually obtained at first sale. These data may merely involve the systematic compilation of information already collected.

(x) The chief gap now existing would be remedied if information now available on fishing effort were extended to give some indication of "cost" or inputs required to produce the products landed. The priority here should go to labour inputs, particularized with respect to area of fishery and time.

Some of this information can probably be obtained from existing sources. In other cases it might be obtained by taking periodical samples, to obtain "factors" indicative of the manning of vessels shown in effort statistics. Crew settlement forms, which some governments already receive and examine for certain subsidy, price or taxation purposes, might also be utilized to produce factors which can expand the information derived from vessel data collected for administrative and biological purposes.

(xi) In this respect, the Meeting stresses that economic knowledge of costs can be obtained from "effort" statistics only if the effort categories are chosen in such a way as to reveal easily identifiable types of fishing units. The statistician must be urged to make his classifications capable of being used for establishing the costs of fishing effort, as well as for measuring fishing power.

(xii) Other costs of fishing include fuel, food and expended gear, as well as the cost of other services employed by the primary producer. These too can be estimated for many fisheries by combining cost "factors" derived from census or survey with effort statistics on the number of fishing units of each type, operating in specific areas at specific times.

(xiii) Capital costs can be estimated by combining effort statistics of fishing units with census information. This census information should be obtained at intervals depending upon the structure of the industry and the changes taking place. These returns are analogous to and may be an extension of censuses of industry or of agriculture. Some countries already collect these data regularly. The capital costs of fishing effort should include the interest and amortization costs of such gear as may be expected to last more than a year, electronic equipment, the vessel, and its engine. In each case it is necessary to know the original acquisition cost to the present owner of vessel, engine and gear, the dates of acquisition by him; and the ages of these assets.

(xiv) The objective is a record of the full economic cost of each type of input mentioned above and the sales market value of each product. Statistics should therefore be supplemented by information about subsidies on products or on the current or capital costs of the fishery.

(xv) The full "cost" of inputs (such as labour and capital) to seasonal fisheries, cannot be completely apprehended without knowledge of the alternative employment of these inputs at other seasons. Such information can best be obtained from occasional sample surveys.

(xvi) The Meeting recommends that governments give consideration to obtaining the economic information outlined above by

(a) using sample surveys;

(b) extending present censuses of industry;

(c) setting up effort categories that can be effectively related to cost "factors" derived from sources (a) and (b); and

(d) any other method.

The Meeting further recommends that governments, when undertaking sample surveys and censuses, collaborate with the international bodies in exchanging information about techniques used.

(xvii) Information is frequently required by international organizations (e.g. the United Nations and FAO) on such matters as the contribution of the fisheries to national income and foreign trade, and their employment of labour and capital. The provision of such information does not present any special problems, provided that the fishery industries, at all stages of production, processing, distribution and marketing, are treated in no less detail in national statistics than are other branches (sectors) of the economy. The Meeting recommends that governments should review their statistical arrangements in this respect and remedy any existing deficiencies."

2.3.4 CONCLUSIONS AND RECOMMENDATIONS

17. The Meeting accepted the report of the working group, and agreed that the economists' requirements can be specified in general terms as the statistics of inputs and outputs, in both physical and monetary terms, for each phase of the industry, specified where appropriate, as to area or fishery, and time. It also agreed to adopt the following recommendations, contained in the working party report:

(a) "....that the international bodies concerned should give early consideration to their likely requirements in this (economic field) and to state them as fully as possible."

(b) ".....that governments give consideration to obtaining the economic information outlined above (see working group report) by

(i) using sample surveys;

(ii) extending present censuses of industry;

(iii) setting up effort categories that can be effectively related to cost "factors", derived from sources (i) and (ii); and

(iv) any other method.

(c) ".....that governments, when undertaking sample surveys and censuses, collaborate with the international bodies in exchanging information about techniques used."

(d) ".....that governments should treat the fishery industries at all stages of production, processing, distribution and marketing in no less detail in national statistics than are other branches (sectors) of the economy, and should remedy any existing deficiencies."

18. It was also agreed by the Meeting that no attempt should be made at this stage to examine the problems and difficulties in fulfilling these requirements.

2.4 STATISTICAL REQUIREMENTS OF FOOD TECHNOLOGISTS

2.4.1 GENERAL REMARKS

19. No written contributions, on the statistical needs of Food Technologists, were presented to the Meeting, but a verbal statement of them was made by Dr. C.L. Cutting (U.K.). He itemized a number of statistical items of importance to Food Technologists, which are not currently contained in national or international statistical publications. The Meeting agreed,however, that at present many of these requirements were of a specialized nature, outside the scope of international statistics reporting, and which could only be handled at the national level. It recognized, however, that statistics of spoilage (condemned fish) form an important item of food technologists' special requirements, which might be covered in international fishery statistics.

2.5 STATISTICAL REQUIREMENTS OF FISHERY ADMINISTRATORS, BUSINESSMEN AND INDUSTRIAL ORGANIZATIONS

2.5.1 GENERAL REMARKS

20. The uses of fishery statistics by government administrators, businessmen and industrial organizations in North America and north-west Europe were contained in documents WP/5, "The Use of Fishery Statistics by Business and Government in North America", and WP/4, "The Use of Fishery Statistics by Government and Business in North-West Europe", respectively, and document WP/6, "Soviet system of Fishery Statistics" outlined the content of the fishery statistics collected in the U.S.S.R. for administrative and other needs. These documents, or excerpts from them are presented below in Section 2.5.2 (A), (B) and (C).

2.5.2 CONTRIBUTIONS

21. A. "THE USE OF FISHERY STATISTICS BY BUSINESS AND GOVERNMENT IN NORTH AMERICA" (J.B. Rutherford) 1/

Introduction

The development of this topic draws rather heavily upon experience in Canada. Fisheries officials from the United States no doubt will add useful comments when opportunity is afforded for discussion during the meeting.

In the nature and organization of business and government and the relations between them, in Canada and the United States there is a much greater array of similarities than of differences. Because of this, the remarks in this paper, made mainly from the background of the Canadian scene, also apply more or less equally to the United States. There are differences in emphasis on the use of statistics within and between regions in Canada, and some of these differences are probably greater than the overall differences in emphasis on uses between Canada and United States.

The Position of Business and Role of Governments

Essentially, the North American economy operates as a private enterprise system with the governments' role 2/ directed to the preservation of as large a measure of free competition as is possible and feasible. Within this role, the governments have accepted a responsibility for ensuring as far as possible, the provision of a "climate" for economic development including a wide range of activities in resource management. Resource management consists of direct supervision of resources by governments and of various forms of regulation and control both over public resources and those natural resources in private hands.

The fisheries industries of Canada and the United States are organized and operate in a similar way to other industries within the broad principles set out above. Where there are differences in the organization and operations of fisheries from other industries these are usually matters of degree rather than absolute differences. In fact, for every exception made for fisheries, corresponding exceptions in terms of organization or operation can be found in other industries. For example, it is accepted that in the fisheries, governments take responsibility for most of the research necessary to improve the knowledge and understanding of the raw material resources and, in addition, the governments have entered into research in technical fields such as product preservation and other matters of product improvement. But this assumption of responsibility by government for fisheries resources is very similar to certain situations in agriculture, forestry, mineral and other resources where governments are also concerned with the natural resources. The relative intensity of effort in research fields is reflected in the demands for and uses of statistics. Government administration of resources has an important bearing upon uses of fisheries statistics for analytical and research purposes. This matter is dealt with in greater detail later on.

1/ Ottawa, Canada

2/ The connotation attached to the term "governments" or "governments' role" throughout this document is general. In both Canada and the United States constitutional arrangements result in varying jurisdictional responsibilities for fisheries between federal, state and provincial governments. Indeed municipal governments in some instances, such as, for example, licensing of processing, wholesale, or retail facilities may have a bearing upon fisheries matters.

In recent years increasing attention has been given by governments to certain aspects of human welfare. This has had a considerable impact upon the uses made of fisheries statistics and has increased demands for special statistics of statistical series bearing upon fishermen's incomes, scales of living, and related sociological data. These developments have not been confined to fisheries; they are paralleled in the interest in the welfare aspects of other groups in the population where considerable attention has been given to the low income and income-vulnerable groups in the labour force.

Classification of Uses

A large proportion of the "uses" of fisheries statistics by both business and government have a common purpose or end. The extent and intensity of use, as between business and government, of many kinds of statistics vary considerably. In the discussion to follow variations in the extent and in the intensity of the uses of different statistical series can be indicated only generally.

There are several ways in which the uses might be classified. For example, the frequency of use might serve as criteria. Or "use" might be classified according to the major use made of the series such as for business purposes, for government purposes or for general research purposes. Almost any classification that is adopted gives rise to difficulties in deciding the category of a large number of marginal cases. In the dynamic situation found in the fisheries industries there is a constant changing in emphasis and a "use" classification cannot be rigidly applied.

A relatively simple two-category scheme seemed to be the most meaningful and appropriate for the purposes of this paper. The categories suggested are based upon the timing of the use, whether immediate or at some future period. They might be designated as an "Action", "Short-term" or "Immediate Use", and a "Planning", "Research" or "Long-term" use.

This classification scheme is helpful in several ways. For example, it bears upon the desirable qualities in the statistics themselves. The degree of accuracy required, both relative, with respect to measurement of change, and absolute, with respect to coverage, must be considered in terms of use. The frequency and timeliness required in matters of collection, compilation, publication and analysis can be decided most satisfactorily against a review of end uses. An illustration may serve to develop this point. A statistical series designed to provide day-to-day market information may be highly useful for such purposes even though it might represent only partial coverage of all the data in the area which it represents. Even an index of fish landings, if it conveyed a reasonably accurate reflection of the relative changes from day to day, might be a sufficient guide to marketing decisions including price decisions. It would not be particularly useful to researchers or planners who were concerned with absolute data on volume of landings - say for purposes such as estimating fish stocks or for development of harbour facilities. Because the resources available for statistical work, both in government and in business firms, are limited, the determination of what will be collected, how frequently, how completely and how accurately, as well as other questions can be solved only by reference to the prospective uses of the data.

The "Action", "Immediate" or "Short-Term" Use

(1) Marketing - Business

North American businessmen, as pointed out earlier in this paper, operate in a private enterprise competitive system. The control board of this system consists of indicator lights in the form of minute-to-minute, hour-to-hour, day-to-day, week-to-weekand month-to-month "prices". The meaning of these price lights is interpreted by the businessman in relation to his decisions in buying or selling, in terms of changes of the flow of raw materials and products through the production and distribution system. High prices may be a "stop" signal in some situations and a "go" signal in others. At some stage or another the price light is interpreted as the yellow light of caution. And again, a low price may convey both "go ahead" and "stop" signs to business, depending upon particular interests, i.e., whether buying or selling. The marketing system is the most demanding in respect to qualities of pertinence and timeliness in statistical series. This undoubtedly has a considerable bearing upon the nature of developments of statistical series for these purposes. Generally, marketing institutions organized by private business have taken a good deal of the initiative and responsibility in the developing of statistical series for their immediate needs. Commodity exchanges, especially those operating on the auction system, initially record catches or landings, quantities passing through the auction system, but of equal and perhaps greater importance the actual up-to-date prices recorded for purchases and sales. In some instances, sections of the fishery industries may collect special information for their own purposes, even in fields where similar government series are available. For example, an industry may want a particular classification of an item for its own purposes - a classification which might be inappropriate to a government series. For its particular use, the industry will consider it worthwhile to expend a special effort.

Many operations of business firms classified in industries, other than fisheries, are consequent upon or derived from activities within the fishery industries. The financial matters in connection with payment for raw materials and the marketing of the products are taken care of by banks; transportation agencies move products from processors through the marketing system suppliers of requisites such as fuel oil, ice, fishing gear, containers and packaging and numerous other businesses supplying the fisheries watch statistical information on the fisheries as a guide in their current business activities. For this purpose statistical series on fish landings, raw material and product prices, product output and stocks and sales to the domestic and foreign markets are followed closely.

The fishery industries, as previously noted, both collectively and by individual firms, conduct similar types of market analysis necessary to their day-to-day business decisions. But in some respects, their interest in market statistics goes considerably further in respect to depth and detail. Particularly, the individual firm is greatly concerned with its market position relative to others. It wants to know what proportion or share of the raw material it is getting. At the other end of its operations it wants to know how it stands in its share of the wholesale and retail market. Current aggregate statistics on output and sales for the industry are followed closely by firms and their own progress is measured against both government and private trade statistical series.

(2) Marketing - Government

Government interest in and use of "market-oriented" statistics is in some respect similar to the industry or business use. It differs to some extent,

however, in that it developes or grows out of the concern of the government with the vulnerability of the often unorganized or only partly organized groups who catch and sell the raw material. Where fishermen have choices or decisions to make about what to sell, when to sell and where to sell there is need for information to aid them in making choices and providing answers to their questions. For this reason, governments provide current reports on market prices, daily, weekly, etc., and also information on quantities of fish sold.

But, the provision of price and volume statistics only by governments for the information of sellers and buyers of fish has in many instances proved inadequate for a number of reasons. Fishermen are preoccupied with catching fish and have little time, even if they were trained or equipped to do it, to carry out an analysis useful to their marketing decisions. Because of this, and to provide for efficient marketing, governments have assumed responsibilities for certain types and kinds of market analysis related to their current market reporting programs. In turn the assumption of responsibility for market analysis has led to increased requirements for statistics and particularly for commodity and product price and volume data. As the use of statistics for market analysis developes, requirements grow more demanding and exacting in regard to the series used for these purposes. Not only is it necessary to have more and better statistics on the raw material flow at the primary level, but in addition, there is an interest in the current utilization of the raw material. This in turn generates demands for statistical series on output, sales or shipments, stocks and holdings, and prices of fisheries products. And as cited above in reference to business uses, further extension of these requirements leads to provision of information on the flow of products to markets, domestic and foreign. And, of course, a concern with the demand side calls for statistical data that can be interpreted as a reflection of changes in demand for fisheries products in both domestic and foreign markets.

The introduction of this last requirement might raise queries as to whether, in a discussion of the uses of fisheries statistics, it is relevant to reach into the area of statistical measurement of consumer "demand". In so far as the measurement of this demand can be narrowed down to an approximation of "demand for fisheries products" it can be justifiably argued that it belongs within the classification of "fisheries statistics".

The foregoing description of the short-term use of statistics in relation to marketing of fish and fisheries products applies to situations where the government's role in the marketing system is passive. But in some circumstances, and this has applied in some situations in Canada, the government itself for one reason or another has intervened and has entered the market place. When this occurs, of course, the government must use appropriate statistics on which to base its decision, on when to intervene and subsequently its marketing decisions. In this respect its uses of the statistics approximate those of private business.

The basis for government decisions on intervention have, to a large extent, developed from unusual circumstances disrupting the demand for fish or fish products, or from the unfavourable effect of an oversupply of fish or fisheries products upon the price. The government's concern is the income position of the fishermen, and especially the effects that price changes have had on these incomes. Consequently, statistical series or combinations of series which throw light upon changes in fishermen's incomes are followed closely by officials responsible for administration of price support or stabilization legislation.

(3) Current Fisheries Management

The governments in the United States and Canada are involved in many kinds and types of fisheries management. There is much greater confidence on the part of all concerned when day-to-day management decisions are taken in the light of up-to-date information. In the Pacific salmon fisheries, for example, management decisions affecting a fishery must be made sometimes as closely as within an hour. The statistics of fish catches or landings, counts of migration, statistics of spawning and so forth are used in arriving at the management decision. At the back of the practical application of these statistics are research and analytical activities of a long-term nature. The use of statistics in these connections is treated in a later section.

Both fishermen and processing firms, carrying out fishing operations use current catch or landing statistics in directing their day-to-day fishing operations. Processing firms may watch the changes in catches in certain areas in order to maintain a flow of supplies of particular species. Firms operating fishing fleets may also direct the skippers of vessels in accordance with changes in day-to-day markets for fisheries products. To guide their fishing activities current catch or landings information and product, price and quantity statistics are watched carefully.

(4) Current Economic Indicators

Among the responsibilities accepted as the role of governments in national affairs in North America is the maintenance of an "economic" climate conducive to the expansion and development of the economy. In order to carry out the short-run aspects of this responsibility, governments have developed a variety of economic services which carry on a running and continuous analysis of the current situation in all sectors of the economy. In fact, these services go further than to provide current analysis, and the forecasting of economic conditions now ranks high in priority. Later on, further reference is made to use of statistics in the research work underlying forecasts of economic conditions generally and regionally.

As a result of a variety of interests on the part of the public in economic matters, government statistical agencies compile and publish currently many so-called derived statistical series popularly referred to as "economic indicators". Such series include index numbers of prices, index numbers of the physical volume of output, various measures of national income, and other similar statistical series. Statistical series for the fisheries enter into many of these "economic indicators". The indicators themselves, as suggested, are provided to meet a variety of needs - labour and consumer groups are interested in changes in consumer prices, including food prices, monetary authorities in changes in the general price level, bankers and the business community in the gross national product and national income changes; a long list of other interests could be set down. Timely current statistics on various aspects of the fisheries along with hundreds of other series are used in compilations of these types.

The "Planning", "Research" or "Long-term Use"

The main use of fisheries statistics in the short-term situation is as an aid to day-to-day decision-making and taking. However, fundamentally, the use of statistics for this purpose in most instances depends upon the availability of comparable statistics for some period in the past and further it depends upon an analysis of the relationships among various series over time. The quality and kinds of analysis undertaken vary greatly, from the intuitive at the lower end of the scale to the more sophisticated types including

elaborate mathematical procedures. It is the use of statistics in the more formal types of analysis and research that are to be considered here .

(1) Research - Business

In general, business has not used fishery statistics to any great extent for formal research programs of its own. This is not to be taken as a criticism or to be regarded as even a suggestion that business in general necessarily should be undertaking this type of work. Business, perforce, has to be concerned with those elements having a more or less immediate effect upon its operation. (Immediate in this context means proximate rather than conveying a sense of time.) Further, business cannot provide the continuity of employment to research workers in the social and physical sciences because it is concerned largely with solving separate and specific problems as they arise and it is seldom that the solution of these problems justifies the employment of skilled research personnel. These observations apply, of course, to conduct of the kinds of longer term research involving considerable use of official statistics. The observations do not apply to technical research carried on by business concerns into problems such as those encountered in techniques of fish processing.

There is, however, an increase in the use of statistics by business generally for purposes of longer-term business planning. Some business firms in the fishery industries along with firms in other industries are now developing five, ten, fifteen and twenty-year programs for expansion and development. Executives of these firms must, in preparing these long-term programs, among other things, be concerned with the prospective raw material supply on the one side and on the other, with the prospective demand for fisheries products, domestic and abroad.

A firm basis for this type of planning can be obtained only through use of adequate and reliable statistics on a wide range of fisheries subjects. These include historical series on catches or landings, output and sales of products, exports and imports and so on. Other important statistics used in planning programs relate to the organization and structure of the primary industry - numbers of fishermen, numbers of boats and vessels, by type; for the processing industry, number of plants and their capacity; for the distribution sector, cold storage facilities, number and capacity, number of wholesale and retail establishments handling fish and quantities handled. In addition to the use of these more or less strictly fisheries series, data relating to industries ancillary to the fisheries, to population, to incomes, to the labour force and to many other items of importance are included in an analysis for business planning purposes.

Business programming and planning in the fisheries must, if it is to be realistic, be based to a large extent upon reliable and detailed information on the fisheries resources. The information needed by business on fisheries resources cannot be restricted to the present, but must, to be useful, be suitable for projecting stocks of fish (and catch) for some years ahead.

(2) Biological Research - Governments and Universities

Earlier, it was stated that business had not engaged in the more formal types of research, and particularly in the research necessary for cataloguing, measuring and forecasting fish stocks and catches. These activities have been carried out by governments and universities. In the procedures and methods involved in this type of research activity, statistics have played a most important role. This importance is evident in the considerable variety of uses and in the exacting requirements for the statistics supplied. It is not an exaggeration to say that for North America the research use in

the past at least has been the principal impetus to statistical development and improvement.

The key series in resource research has been catch or landing statistics The emphasis given in these "biological-biometrical" researches has been on a "catch-per-unit of effort" measure as indicative of "abundance" and changes in "abundance" with time. While the "key" or perhaps even a better term, the "core" series required is catches or landings, this series, for more in ensive research, has to be supplemented by statistics indicative of "effort". Thus, additional statistical series such as numbers of fishermen, numbers of fishing vessels, and quantities of gear are required.But even more detailed data on the physical inputs in each fishing operation are needed and as the research becomes more detailed and refined, special collections are undertaken to obtain information on fish growth and development, age classes, incidence of disease and many other subjects. Application of these data leads to the setting up of mathematical models and at this stage other statistics such as oceanographic data are taken into use.

(3) Economic Research - Governments and Universitites

In more recent years, increasing attention has been given by governments and universities in North America to the longer range economic research required in connection with fisheries development programs. The sense in which development is referred to here is "economic", and this does not mean necessarily the purely physical growth of the output of the fisheries, or of a fishery. In a broad sense it means facilitating adjustments in the fishery industries to improve productivity and to raise levels of income. This adjustment process may mean various changes up or down in numbers of fishermen, vessels, plants, quantities of catch, output of various products and a consequence of changes in many other aspects of the industry.

Because the economists and sociologists are interested in income levels, their uses of statistics in research, directed to development purposes must take account of prices and values. This requires the use of market statistics relating to demand. Demand arises from persons and their buying power. Therefore, the economist uses statistical information on population, food consumption habits, incomes and expenditure patterns and other statistical data required for projecting demand. Canada exports a large proportion of its output of fish and for this reason there is a considerable use of statistics in research relating to current and future demand in countries importing Canadian fisheries products.

When demand projections have been determined in terms of raw material (fish) requirements the economist must match these with the biologists' projections of catch. Then, having regard to the nature of the demand (i.e., its elasticity) the next step is to estimate the interaction on price and consumption. While there is lack of data, and often even when it is available the lack of reliability may preclude a refined anf formal analysis in the detail just described, yet a considerable number of fishery and other statistics are under continuous use in the research necessary for the formulation of fisheries policy and development programs.

In a government's role in the economy of today there is an increasing need for the co-ordination of the range of activities and services in the many fields in which the government participates. Proposals for aids to navigation, harbour works, roads, water supplies, sanitation, extension and advisory services more and more are being decided on the basis of a long term program. Statistics of the fisheries and the kinds of research based upon these statistics, already described, are required and used by governments.

(4) Industry - Structure

The description of the uses of statistics to this point has concentrated upon what may be called "series" statistics. These are the regular recordings of day-to-day, week-to-week, month-to-month and year-to-year situations in the various operations and activities in the fisheries. Generally, these series are not collected or compiled to provide a breakdown by entrepreneural units, that is to say for fishing enterprises and for fish processing or fish cold storage firms. For certain important aspects of economic research, the use of statistics as a means of analyzing and describing the structure of the industry is highly important. In Canada, a census of the primary fishery industry, that is the fish catching industry, taken in 1951/52 provided comprehensive detail on the numbers of fishing enterprises, their organization and capital structure, receipts and expenses and detailed information on their operations over a year. The resulting statistics have been used for several special purposes, and particularly by the governments in relation to development programs for the industry.

(5) General Economic Investigations

At an earlier point, reference was made to the role of government in providing an "economic climate" in which development would be facilitated. The preceding discussion has dealt with the longer term uses of statistics, and the research based upon them, in taking decisions upon physical facilities in so far as they are required in fisheries and community development. The term "economic climate" implies considerably more than meeting the purely physical needs such as vessels, wharves, plants and so forth. It means the establishment and maintenance of a sense of stability, growth and of a flexibility in adapting to changes as they arise. It carries on obligation, regarding suitable and appropriate fiscal and monetary policies, a regard for the problems of regions and the maintenance of the kind and degree of competition conducive to growth. In order to adjust fiscal and monetary policies, governments must have not only good statistics on the current situation in the total economy and in various sectors such as fisheries; but it must, in order to be able to deal with a situation promptly, have sensitive indicators so that action can be taken in sufficient time to prevent deterioration or run-away-booms. This has resulted in the development of government forecasting services which are almost totally dependent upon statistics for their projections. But their forecasting job can be performed satisfactorily only by research, by discovering relationships, and projecting these for shorter or longer periods. This long-term research for forecasting purposes consumes large quantities of current statistical series, including fisheries statistics.

(6) Governments and International Fisheries Management

The increase in activities of various international bodies and organizations has brought about a greater use by national governments of statistics for the fisheries. In North America this has been hastened perhaps more than elsewhere by the series of fisheries agreements and treaties in which Canada and the United States participate. These agreements and treaties now cover fisheries of the North West Atlantic, the Great Lakes and the Western Pacific, including whaling operations in both the Atlantic and Pacific. In the negotiations and proceedings leading to the drawing up of fisheries treaties and agreements, many fisheries statistics have been used in arriving at workable and acceptable articles and clauses. Longer-term research, in which statistics often were a major ingredient, not only aided the negotiations but in some instances the findings were a major factor in impelling governments to international action.

When agencies have been set up to administer the treaties and agreements, high priority has been given to statistical programs necessary to assist the agencies in carrying out their functions. This has involved examination of existing statistics for adequacy and reliability and communication of the needs to national governments. At a later stage, these statistics have been used in longer-term planning by these agencies as well as in day-to-day management use. This was commented upon in an earlier section.

Conclusions

Undoubtedly, readers of this paper will have noted omissions of particular uses of fisheries statistics with which they are familiar or will consider that inadequate or insufficient emphasis has been given to some of the uses cited. These views will be related in part to the particular specialization of the readers' interests and some interests probably have been neglected. For example, co-operatives in the fisheries may have some uses specific to their form of organization and operations but, in general, these have been considered to be coincident with business interest. There may be a view that the subject has covered too broad a territory in extending a paper on uses of fisheries statistics into fields such as population or oceanography. In contrast, some may consider that important matters have been omitted, as for example lack of reference to the use of statistics on the part of industry in presenting its problems to the government or to government agencies such as tariff and transport boards.

One of the difficulties today, in assessing uses of the whole range of government and privately-produced statistics is that the very mass of information available overwhelms the individual to the point where the use of reference to statistics has become an almost subconscious action. Newspapers, magazines, business periodicals, scientific treaties and other media and writings are replete with or find their basis in statistics. To ask the businessman or even the government administrator for a recitation of the uses he makes is likely to yield a list erring greatly on the side of understatement. Perhaps the best test of uses is the withdrawal from publication of a statistical series. The reaction is usually immediate if the series has been useful, and the appeals for reconsideration trail out over a long period reflecting the awakening of the subconscious users as they discover the lack of information. Perhaps the best way to discover uses would be to declare a statistical holiday and suspend all publication of data. However, the cost of imposing a "blackout" on statistics in the North American economics would probably, if it could be reckoned, be much beyond what people would be willing to pay.

22. B. "THE USE OF FISHERY STATISTICS BY GOVERNMENT AND BUSINESS IN NORTH-WEST EUROPE" 1/ (G.M. Gerhardsen) 2/

General Remarks on the Role which Fishery Statistics may play in Government Policy-making and in Business

Governments are perhaps the most important users of the statistics which they themselves publish, and this is true also as regards fishery statistics. The kind of statistics they require may very from one period to another and often from one country to another. Yet, in the very varied field of work

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1/ Author's Note: Geographically, the term North-West Europe is not quite correct. For reasons of convenience this paper is based on an analysis of the systems of fishery statistics in the following countries: Belgium, Denmark and the Faeroe Islands, France, Germany (the Federal Republic), Iceland, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, and the United Kingdom.

2/ Bergen, Norway.

which is normally classified as fisheries, similarities in the need for and the use of statistics are great enough to call for several observations. In addition, we must consider such useful purposes as fishery statistics may come to serve in the future, if and when governments become more fully aware of their possibilities, and statistical services become better developed, one way or the other.

One may ask why governments use statistics - that is, for what purposes and at what level of government administration; and, moreover, how they use them and how frequently. But only very few sources are available for obtaining such information. The present writer is not sufficiently informed on all aspects of the matter. Some clues might possibly have been found by the study of Parliamentary records; but, with few exceptions, shortage of time made such a procedure impossible. It was therefore decided first to give a brief account of the statistics which are at present available; in this way the widest range of possibilities in the use by governments of statistics in the primary, secondary and tertiary phases of fisheries may be indicated. (This classification into three phases corresponds well with the one introduced by Jean Le Garrec: (a) "Statistiques de constatation", including "production", "transformation" and "commercialization"; he rightly adds (b) "Statistique d'investigation".) The governments may or may not have availed themselves of these possibilities.

Secondly an account will be given, in general terms, of the role which modern governments normally play in their own policy-making and especially in fishery development programs. This latter point will be dealt with here in the introduction, while the former will be studied in section B. Then, in section C, a brief assessment of the adequacy of statistics will be attempted; and, in section D, references to internationally compiled statistics will be given.

It is no doubt realized by all European countries that - to quote F.M.G. Wilson - "A very great deal of governmental action in the economic field depends on the existence of adequate statistical information and on the sort of knowledge which can only come from empirical enquiry into economic behaviour. Moreover, the government gains if the fruits of its statistical work and of its economic investigations are made public because only by such publication can an informed opinion be created, which will not merely comprehend but may well demand the action by the government which enquiry and statistical trends show to be desirable...."

Mr. Wilson goes on to say that in his thesis he restricts the use of the word "statistics" to refer to the "regular collection and publication of such information". This acceptance of "statistics" is quite common. One might even go so far as to say that, apart from some investigations, the present approach to existing fishery statistics - even to those on fisheries development - is <u>static</u>. What is needed is a <u>dynamic</u> approach to the study of fisheries. In such an approach the various factors of growth and development must be studied simultaneously.

Statistics on the external trade in fishery products, which normally embrace exports and imports of all aquatic products, may be used as an example of a field which is well developed in Europe. Such statistics may be considered a necessary basis for commercial policies, and, more specifically, for the negotiations of trade agreements. Where bilateral agreements with barter trade are used, statistics will also be essential in keeping a check on the flow of trade, and for ascertaining the extent to which contracts have been fulfilled.

Generally speaking, statistics are used for describing the role of the fishery industries with respect to the magnitude of, say, food supplies, feeding stuffs and industrial raw materials derived from them, the capacity of the fleet, and the strength of the labour force; conversely, information is obtained on the number of people dependent on the fisheries for a livelihood, and their need for welfare schemes; on the size and characteristics of the fishing fleet and on its requirements of credit, insurance, etc. Moreover, in a number of countries, the contribution made by this particular industry to the national income is now being roughly calculated, and this is often considered indispensable information.

All these "elementary" facts about the fishery industries are somehow covered in many national statistics; but there is yet much greater emphasis on government initiative in the management of resources. More and more, governments tend to interfere in the industry, and to aid and support it; above all, European co-operation in all fields is becoming more intimate. The result is that the need for more facts on the production pattern, on the economic structure and on the competitive power of various national industries is becoming apparent. Credit schemes may be launched, and credits and subsidies may be, and have often been, granted without statistics. But for the assessment of the effect of such activities, statistics are essential and can be extremely useful when matched with common sense and professional knowledge and experience. It will not be suggested that work on external trade statistics should be curtailed; but, with the increasing emphasis on the assistance given by governments to their fishery industries in all their aspects, one is often under the impression that similar or even greater stress may be laid on other aspects of economic activities in fisheries.

The use of fishery statistics is necessary also in fisheries business. Although people employed in the industry may sometimes be reluctant to supply information, particularly perhaps on the cost and earnings in their enterprise, the aims of business and of government in a harmonious community are normally the same; governments and business are therefore likely to agree to co-operate for the improvement of statistics. Already in many countries statistics have become the common language, as it were, in dealing with the problems of fisheries. Abuses may have brought fishery statistics into disrepute; but this should be no bar to the proper use of an effective and concentrated way of conveying information, and to analyzing the problems of the industry.

Over the last fifteen years or so, all countries in North-West Europe have seen considerable changes in their fishery industries. One may perhaps say that all dynamic administrations in government and business are really agents of development 1/. With the strengthening of industrial organizations the need for statistics has grown. By and large, fisheries have become more industrialized, commercially more developed; and, with this trend, statistics are becoming more necessary.

With the changing pattern of fishing, of fish processing and of trade, the pattern of fishery statistics must also be reviewed and, if necessary, revised; and their reliability must be improved. Statistics which have so far been sufficient do not necessarily continue to suffice. Whenever an economic crisis sets in, ad hoc - or more permanent - investigating bodies will be formed, and often new sets of information will have to be collected. Above all, the reasons why a crisis developed must be investigated.

1/ This phrase, it is believed, was developed jointly by Dr. G.L. Kesteven and the author in a recent conversation on fishery development problems.

To sum up: briefly, the fields in which governments assist the fishery industries are the following:

(a) Initiation, enactment and enforcement of legislation and regulations pertaining to resource management, labour force, welfare, procurement of capital equipment and operational technique.

(b) Research.

(c) Experiments and pilot-operation; advice, extension service, encouragement and promotion of development, based on research and experiments.

(d) Financial aid to the industry:

(i) Subsidies on a flat rate basis, or to cover individual losses.
(ii) Investment in boats and/or processing establishment.

(e) Economic control and policy:

(i) External trade policy.
(ii) Regulation of prices.
(iii) Supervision of business organizations in fisheries.
(iv) Engagement in business.

(f) Welfare schemes and arrangements for education.

This list is in no way exhaustive; it is intended to be only a rough indication of the types of activity in which the government of a fishing country normally takes an interest, and of the scope of these activities. Also, the various kinds of activities are inter-related; hence, each of them cannot be considered in complete isolation. Notwithstanding these shortcomings the list may form a useful background against which, in the section that follows, the adequacy of available statistics can be assessed.

Available Statistics

(1) Catch and Landings Statistics

These statistics are, to all parties concerned, the most common "gauge" of trends in fishing. If catches are good, that is the first, if rough, indication that the fishery may yield a satisfactory profit. If catch figures are low, it is the first sign of financial losses. Neither financial nor quantitative results can be forecast in fisheries. There is an element of gambling in them, and both government and industry watch the figures on catches and landingswith the greatest interest. Drastic declines in this rough "index of prosperity" may entail questions in parliament; fishermen's organizations may approach the government; and scientists, whose research programs may have been starved, will again be mobilized.

Annual figures on catches and landings are no longer sufficient. In business, daily statistics on catches are now not uncommon. In Norway, for example, the Winter Herring Fishermen's Co-operative Sales Organization bases its work on daily statistics. Similarly, big firms engaged in fishing may keep daily statistics - or statistics for each voyage - showing the results of each individual boat. Trade journals in Great Britain, Iceland and Germany publish frequent figures on fishing in the individual areas. In Norway the Government has for several decades arranged for daily and weekly telegraphic dispatch of figures indicating the trend in the big seasonal fisheries, such

as the Lofoten fishery; in this way it keeps itself and business alert to the trends on which depends the final output.

Over the last fifteen years the issue of monthly statistics on fish landings has become the normal procedure in almost all countries under review; Belgium and Spain, for which no information on this is available, are exceptions. In many cases these statistics have not yet crystallized into standardized publications, and in many instances cheap printing methods are used; some of the statistics are made available through fisheries journals. Contrary to what happens in the case of many of the traditional annual statistical publications, the monthly statistics are normally very punctual. This greatly increases their value even though they may be lacking a little in accuracy. Annual statistics which are published with a time lag of two or three years - and this does occur - must have lost some of their value both to governments and to business. Modern methods of compilation contribute greatly to get the statistics published as soon as possible. At present, four of the twelve countries under review complete the printing of their annual statistics within one year; four countries take as long as two years, and one even more. For three countries no information was obtained on this particular point. Belgium and Iceland no longer issue any special annual puclication of their fishery statistics.

Indirectly, landing statistics are used by governments in their research departments. It is worth noting that for biological research the classification of catches by areas, and by the main gear and types of craft used, would be highly desirable; and through the good offices of the ICES much has been done to promote a joint effort in this direction. For economic research, statistics on effort (which could be compared with gross financial yield) and a clear indication of the uses to which the catches were put would be desirable. In this respect, however, fishery statistics have been lagging somewhat behind in their development.

(2) Statistics on Man-Power in Fisheries

Some of the countries, where fishing plays an important part in the economy, like Norway, Iceland and Portugal, have separate entries for fishermen in their decennial population censuses, and the annual publications on fishery statistics often give the number of fishermen. For Iceland and the Faeroes, however, no regular annual information is given. In Norway the total figure is split under three heads, namely, "only", "main" and "occasional" occupation, while Denmark and Sweden do not include the last category. Some countries combine "only" and "main" occupation; some use the time spent in fishing as a basis for their classification while others use the net income derived from fishing. In many cases all these classifications are based on estimates. Apart from this division of the total number of men according to the importance of fisheries to them, many countries also give the total participation in the various seasonal fisheries. Some countries, for instance Belgium, state the number of fishermen according to their designation on board the vessel.

What seems to be lacking in a great many countries is a more penetrating sociological analysis of the fishermen's communities. Thus, it might be of considerable importance to government agencies to know the number of men who are employed in agriculture and in other industries when they are not fishing, particularly in countries where there is a preponderance of small-scale fishing enterprises. Educational facilities, age composition (as given to some extent in Norway and in the Netherlands as far as hired fishermen are concerned) and the stability of the labour force would be well worth looking into.

Full employment is the target in many countries, and to help governments to achieve this end, detailed information on the labour force is imperative. The fisheries' offer peculiar problems of their own in that the accessibility of the resources are subject to great seasonal fluctuations with corresponding variations in employment opportunities. In Norway, to counteract these difficulties and to comply with the general requirements in the welfare state, special schemes for old age pensions, accident and health insurance, minimum share income, etc., have been introduced. To many countries, this is an important problem. Conversely, where labour is in short supply, as, for instance, in post-war Norway, the fluctuations and consequent risk as regards income level, may make it difficult for the fisheries to find men to man the boats. From all these points of view, governments who want to take action will need statistics to go by. And statistics are at least equally important for long-term planning with respect to labour, its availability and its welfare.

In the execution of welfare schemes current statistics are used for the calculation of expenses to be incurred.

(3) Statistics on Fishing Craft and Gear

Catch and landings statistics to a large extent lend themselves to international comparison, particularly when they are converted to a common weight-basis by means of standard conversion factors, already available. On the other hand, statistics on the capital equipment in fisheries seem to have developed on a strictly national basis and to have adjusted themselves to the peculiar nature of the industry in each individual country. They therefore suffer from an almost complete lack of uniformity. It is common, however, to distinguish between power craft and non-power craft; and a distinction between coastal, "middle-water", and distant-water craft is also made use of in a number of countries. For the indication of craft size, Belgium, Italy and Sweden classify by horse-power, while France, Denmark, Germany, Iceland the Netherlands and Portugal classify by tonnage (although to a large extent different classification methods and different definitions of tonnage are used). In Norway, Iceland and the United Kingdom length groups expressed in feet - and in Germany, to a certain extent, length groups expressed in metres - are used.

Only very few countries, for instance, Norway, the United Kingdom and Germany, publish regular data on age composition of their fishing fleets. Very little information is given on changes in design, accommodation and technical equipment. In one particular case where this has been done, namely, in the Norwegian Winter Herring Fishery, it has been found to be of great value.

Information on fishing gear is almost non-existent, and it must also be admitted that it is difficult to maintain such statistics. Earlier, such data were supplied in the annual Norwegian statistics; but they were considered so doubtful that they were dropped nearly twenty years ago, and the latest figures collected are from the first fisheries census conducted in 1948. Sweden and Denmark furnish information as to the stock of different kinds of fishing gear at the end of each year.

Belgium, Denmark, the Netherlands, Norway and Sweden furnish annual statistics on the value of the capital equipment involved in fisheries. The total value of the fishing fleet is estimated and the basis for such estimates may vary from one country to another. Insurance value, sales value, construction and even re-construction costs are all being used. Norway gave particulars on the total value of her fishing fleet as on 1 October 1948, the date of her fisheries census; these data are based on information from the individual owners.

The Netherlands supply information on the various types of mortgaged fishing boats and also on the total amount of mortgage debts. Credit statistics, such as those of Norway, indicate the total extent of borrowed capital in the fishery industries, the sources by the main kinds of credit institutions, and the type of loan chosen. It might be desirable to know the distribution of credit on boats, gear, etc.; but this is not yet included in the statistics.

From the available evidence it is difficult to discern any clear trend in the use by governments of statistics relating to craft and gear; but it may be assumed that by the end of the Second World War, the structure and magnitude of the fleet as it was in 1939 was set up as the primary target for the reconstruction programs both by business and by those governments which participated actively in the effort. In normal years, when initiative in the field of investment is left mainly to private people, governments will be interested in following the trend in the size and composition of the fleet; and, likewise, business will be interested because of the impact which any change in the producing capacity might have on the secondary and tertiary phases of the fisheries.

In some countries compulsory registration of fishing craft has been introduced for control purposes. In Norway, for instance, the registry provides a check on the ownership, which is necessary for the implementation of special legislation. To some extent these registers are also used as bases for statistics.

Denmark and the Netherlands are the only countries which furnish regular information on the movement in the prices of such articles as come under running expenses; for instance, oil, ice, gear, etc.; and the Netherlands is the only country to publish interest rates for borrowed capital, and depreciation rates; they also give and index (on Paasche's formula) which shows the aggregate trends in the price movements for these items.

(4) Statistics on Processing Establishments

The need for statistics on processing establishments and on other aspects of the secondary phases in fisheries appears to have been realized much later than the need for catch and landings statistics; yet, in the wider sense of the word, these also belong to fishery statistics.

In Norway, the total number of processing plants of various kinds (e.g. meal and oil reduction plants, canneries, freezing plants) has been known for some time; but it is only recently - through the 1953 "Census of Establishments" - that some details on the capital involved, the man-power employed, the gross turnover as well as on some main cost items have become known. Unfortunately, the information on these aspects has been collected on a very general pattern which is also used for all sorts of industrial establishments, and some details which are desirable are therefore missing. For example, statistics on the capacity of the plants in Norway and on its utilization are far from being exhaustive. Often the Government has been instrumental in promoting the development of new industries; and in the construction of freezing plant, the Government of Norway has taken an active part. The problems connected with the fullest possible use of the capacity of some types of processing plant in its impact on costs have been studies on an ad hoc basis.

(5) Fish Marketing Statistics

Any statistics on the agents of production in fishing (fishermen, craft and gear) and statistics on their output in terms of fish landed, are valuable data, which must be used for studies of marketing conditions. Both individually and jointly through the OEEC, European countries have made use of such

statistics in assessing and planning their industries. Also, as already mentioned, monthly and annual statistics on foreign trade have been developed to a fairly high standard. But there are many phases of fish marketing where only very little information can currently be obtained from statistical publications.

For instance, there are hardly any statistics to describe price behaviour in domestic markets, the quantitative movements of various fishery products, the means of transport available, etc. It must, in fairness, be said, however, that some countries prepare reasonably reliable statistics on the average retail prices of fish (together with similar statistics for other important food items); and statistics on family budgets (the first Norwegian investigation on fishermen's family budgets was conducted in 1954) are used to present samples of the characteristic pattern of consumption applying to various groups of consumers. Also, they form the basis for cost of living indices.

The general information referred to above may, of course, suffice for the development to be watched; and as demand patterns do not change very rapidly, it may be of some use to business also. But in many cases, more searching studies are desirable.

Dr. D.J. van Dijk has given the following pertinent description of the way in which statistics may be of importance to various people in the fishery industries:

> "... On the basis of statistical information and guided by his feeling of the development of the industry, a shipowner can even decide to enlarge his fleet or expand its catching capacity; or else he will abandon old fishing methods and adopt new ones. It is clear that in such cases his decision cannot be based on intuition only: it is necessary that sufficient and rightly chosen figures are available for a decision to be made. This is especially important as fishing calls for ever-increasing investments. The responsibility of those collecting and analyzing the statistical material is very great.
>
> "For the trade also, long-term statistics are important for its economic activity. Daily price-quotations and landing-statistics are only important for describing a market which already exists, but the importance of statistics goes much further for those who are to win new markets. These traders are not bent on getting rid of a quantity of fish anywhere: they search for a permanent enlargement of their sales and outlets. Facts which only change the economic conditions for a short time are not important for this purpose. But in order to find out whether circumstances have permanently changed, they cannot do without statistics, ratio-figures or index-figures giving a picture of the long-term development...".

From the economist's point of view, various characteristics of both supply and demand will have to be described and analyzed, because, for many important products, only rough indications are so far available.

With respect to demand studies, governments as well as business have made fairly detailed studies of individual market areas. The results of these are seldom reflected in regular publications on fishery statistics; but they nevertheless deserve the greatest attention. No doubt they form very necessary pre-requisites to most schemes for consumers' education and for sales promotion as far as fishery products are concerned.

As for supply studies, they are often known as studies on "profitability", or on "cost and earnings" in fisheries. In short they serve two purposes: firstly, they may give an indication of the cost structure for fishery products under varying conditions (with fluctuations in quantities, etc.), and thus provide some clue to the shape of the supply price curves for various categories of these products; and, secondly, they may give an indication of profits (i.e. earnings) in the various phases of fishery activities.

As far as the author knows, among the countries under review, it is only the Netherlands, Norway and Sweden which are found regularly to publish statistics based on sample investigations of cost and earnings in fishing operations. While these statistics are no doubt useful for many purposes in government and business, they can hardly be said to play a very important part.

Assessment of Adequacy of Statistics

From the foregoing sections it will be clear that, in the author's opinion, the pattern of fishery statistics is, generally speaking, lagging a little behind requirements. This is confirmed by the many instances where the work of special committees is hampered by the want of requisite information in routine statistics. Governments are beginning to see that their responsibility for the development and maintenance of financially sound and prosperous industries has in post-war years become so great that statistics on the traditional patterns are no longer satisfactory. No more need be said about statistics in biological research. With the present stress on population dynamics, accurate and detailed statistics are a necessity; but one might still make a point of stressing the importance of statistics as a necessary basis for the fishery policy-making of governments; i.e. for the interference on the part of governments, for the guidance and support which they intend to give, or which they have in various ways already given, to the industry.

Big firms in the fishery industries can afford to work out their own statistics on many aspects of the trade, and they know how to use them effectively. Small firms and fishermen who own their boats have often organized themselves in associations in order to improve their bargaining power. As private firms grow bigger and as trade associations come to play a more important part, facilities for statistical analysis are likely to become better. But, because of this development, the demand for such statistical services as the governments render to the industry will become greater. Many governments may wish to consult the industry and its various organizations on their requirements.

There may be many reasons why business enterprises do not use statistics as much as might be desired. In his paper referred to above Monsieur Le Garrec has expressed the view that modes of presentation are often to be blamed and he adds: "Bien moins que les organismes administratifs, les professionnels ne sont habitués à la consultation de séries impersonnelles de chiffres. Nombreuses sont les études à caractére technique qui ne trouvent pas d'audience auprès des milieux auxquels elles s'adressent, parce que leur lecture est d'une aridité qui rebute". The need for straight and intelligent presentation of fishery statistics can hardly be over-stressed.

Desirable Trends in the Development of Fishery Statistics

The above line of thought also reminds us that in the individual countries there is a growing recognition of the need for comparability across national boundaries. With the greater integration of the national economies in North-West Europe this recognition will gain in strength. Greater stress

may then have to be laid on the economic efficiency in the fisheries and on comparative studies to increase efficiency. In statistics on international trade a good deal of standardization has already been achieved through the good offices of the League of Nations and, later, of the United Nations; the latter have created their "Standard International Trade Classification". Moreover, through international co-operation in the field of biological research and through the good offices of the FAO, much has been done to achieve comparability in landings statistics. However, it seems that statistics on the amount of effort (man-power, fleet, fishing gear, etc.) have just about been started; further, that statistics on economic efficiency and on costs and earnings are in their infant stage, and that national statistics on domestic marketing are, with few exceptions, inadequately described. Apparently the governments would be better able to serve their fishery industries if these matters were attended to.

23. C. "SOVIET SYSTEM OF FISHERY STATISTICS" (V. Shparlinsky) 1/

Introduction

The Soviet system of fisheries statistics in general, and of fisheries statistics in the North Atlantic, in particular, is determined primarily by the requirements of a planned economy. The composition and nature of the statistical data must enable further planning of fisheries operations in conformity with the general plan of economic development of the country. Statistical data must be used in estimating both the quantitative and qualitative results of fisheries' operations, i.e. volume of catch and output of fish products as well as labour productivity, choice and quality of fish products, cost price of fresh fish and fish products, etc.

By comparing statistic data with target figures, the percentage fulfilment of state quotas by the fishing industry can be estimated. Similarly, analyses of statistical reports are used as a major starting point in drawing up future plans.

In the preparation of the Soviet fisheries statistical reports for the North Atlantic, much importance is attached to providing the necessary initial data for scientific research, especially relative to fishing resources. Statistical data, giving the composition of catches by species and sizes, their geographical distribution by fishing areas and sub-areas, seasonal distribution and dynamics of catch per unit effort are widely used by Soviet biologists in their research work.

Fishing Statistics

The Soviet fishery in the North Atlantic is developing primarily as an open-sea fishery. Nowadays, up to 88 per cent of its catch in the North Atlantic (including the Baltic and White Seas) is produced by fishing ships, mostly large ones. The trawl fishery produces the greater part of it, up to 53 per cent of the total catch, and the drift fishery up to 34 per cent. Coastal fishing produces only 12 per cent of the total catch, stake nets being used for it in most cases. Therefore, the Soviet North Atlantic fishery statistics include for the most part data, characterizing operations of the fishing fleet.

1/ Moscow, U.S.S.R.

Statistical data on fishing fleet operations are grouped by classes of ships. The following classification of fishing ships is accepted for the Soviet fisheries in the North Atlantic:-

(a) BMRT Big-Size Refrigerator Trawlers, from 1900 to 2000 h.p., used for the demersal fishery. They employ the stern trawling method and have fish processing plants on board (refrigerating, filletting and canning plants, as well as an oil-and-meal plant for processing fish waste). These trawlers land fish products all packed and ready for marketing.

(b) RT. 800 to 1100 h.p. trawlers used for the demersal fishery. These ships turn in their catches in the form of semi-processed products which have undergone primary processing in the sea (cutting, cooling, salting, drying of waste) and are to be finished at the land processing plants.

(c) SRT-600 Middle-Size, 600 h.p. trawlers, and

(d) SRT-300-400 Middle-Size 300 to 400 h.p. trawlers.

Ships of this class are designed mainly for herring fishing with drift nets. However, in certain seasons they are also used for the demersal trawl fishery. Whether fishing herring or bottom fish they usually operate coupled with mother ships and refrigerator ships. Catches of fish under-go primary processing on board the SRT trawlers (on SRT 300-400 salting of herring in barrels, on SRT-600 salting of herring, cooling of herring and bottom fish for subsequent freezing), and are then delivered to mother ships or refrigerator ships as semi-processed products for further processing.

(e) MRT Small Size, 150 h.p. trawlers designed for the demersal fishery in the areas near to ports. These trawlers land their catches in the form of fresh or salted semi-processed products.

(f) TRB 80 h.p. trawlers designed for trawl fishery in coastal zone.

(g) RS-300 seiners, 300 h.p., designed for purse-seine and drift fishing of herring and trawling for bottom fish.

Ships of the last two classes land their catches fresh.

Statistical reports on fishing fleet operations are made separately for each of these classes of ships. In those cases when ships of a certain class have been engaged in different fishing operations in the course of a year (for instance, drift fishing of herring and trawl fishing of bottom fish), statistical data are submitted separately for each type of fishery. That facilitates the analysis of technical and economical data on fishing fleet operations, depending upon various uses of ships of certain classes.

Fishing records kept on every ship are the initial documents showing the results of fishing fleet operations. These records include detailed information about operating conditions, as well as about results of operations. Items included in fishing records depend upon the type of fishery (trawl, drift, purse-seine, etc.).

Captains of fishing ships submit to their head offices, monthly reports on operations of their ships, in letter or by radio. These reports show specifications of the ship (class, horse power, number of men in the crew), catches, and all the elements of operating conditions. These reports serve as initial documents for making a "Report on operations of the fishing fleet and use of fishing gear". Besides, upon completion of every trip, captains of trawlers submit reports on each trawl hauling operation performed during the trip, containing the following information: fishing area, water and air temperature, specifications of ground, time spent on all the trawl operations, catch and its composition, food fish feed on, pre-bottom animals found in the trawl. These reports are used mostly by local scientific bodies for their research work and are not summarized any further.

"Reports on operations of fishing fleet and use of fishing gear" are the major statistical documents, containing summarized data on catches, which are used as a starting point for estimating catches per unit effort. Such reports are prepared by every economic organization with independent balance. Such reports must be submitted quarterly and annually.

Since average data on operating conditions of every ship, as well as catches per ship are computed by dividing sum totals by number of ships, it is very important to know the exact number of ships. The Soviet fisheries distinguish: (a) the number of ships on the list, and (b) the number of ships in operation. The "number of ships on the list" includes all the ships belonging to the given organization at the end of the reported period (year or quarter). Thus, all the ships, regardless of how much time they were in actual operation during the given period, are included in the "number of ships on the list".

The operating time includes the time in the open sea and the time of mooring at port. Repair periods are not included in the operation time (except maintenance repairs made between two trips).

Knowing of the number of ships on the list is not enough for drawing up plans of fishing fleet operations. It is impossible to fix quotas for a group of ships, although belonging to the same class, — some of which were in operation during the whole period reported, and others were in operation only part of that period. In order to estimate the effect of duration of actual fishing trips made by the ships, the term "operating ships" was introduced by the organizations planning the Soviet fishing fleet operations. "Operating ship" means a conventional ship which was in actual operation 91 days a quarter, or 365 days a year. Then the number of "ships in operation" per year is computed by the following formula:

$$\frac{A.x + B.y + C.z}{365}$$

where:

A,B,C = number of fishing ships
x,y,z = time the ships were in operation.

The major elements of the operation regime, taken into account in the Soviet fishery statistics are as follows:

(a) Time spent in the open sea, which means all the time from the moment the ship sails from the port, till its return to the port. From the total time spent in the open sea the time of actual fishing operations is singled out as the most important element.

(b) Time of mooring in ports. That means the time spent by ships in ports. However, it does not include time a ship may stay in a port for repairs.

(c) Time spent for repairs of ships (except maintenance repairs made between two trips). It also includes time of waiting for repairs in ports.

By correlating the above elements of the regime of ships' operations, it is possible to estimate to what degree the fishing fleet is used for productive purposes, that is, for actual fishing. The more time a fishing ship spends in the open sea, and the greater part of that time is used for actual fishing, the higher catches may be expected, other conditions being equal. Dynamics of such data taken for a number of years, is a very important index of the trends existing in the utilization of the fishing fleet.

Statistical reports must also include data, characterizing the efficiency of fishing fleet operations during actual fishing, which may be used as a starting point for estimating catches per unit effort. The following quantitative data are reaqired for various methods of fishing used by the Soviet fishing fleet in the North Atlantic:

(a) hours of trawling, for the trawl fishery;

(b) number of net drifts, for the drift fishery;

(c) number of hauls, for the purse-seine fishery.

Since the statistical reports are supposed to include not only data on total catches for every class of ships, but also data on catches obtained by each fishing gear, the computation of catch per unit effort offers no difficulty.

The Soviet fishery statistics do not include data on the number of men in the ships' crews. Inserting such data in statistical reports seems to be unnecessary since definite crews, including personnel for fishing and processing operations, are established for all classes of Soviet fishing ships, depending upon their duties. Deviations in the actual number of men in ships' crews from that established by staff regulations are usually negligible and may be ignored. Thus, average catch per man participating in the fisheries, for every class of ships, can be computed by dividing total catch by the number of men in the ship's crew as established by staff regulations.

Difficulties are encountered in computing average catch per man for the BMRT big-size refrigerator trawlers. Ships of this class are engaged not only in fishing but also in complete processing of their catch; their duties include functions performed by land fish-processing plants for regular trawlers. It is practically impossible to divide the personnel employed by such trawlers into groups engaged in fishing or processing alone. Therefore the data on average catch per member of crew of a BMRT trawler cannot be compared with similar data for trawlers of other classes.

Statistical reports on coastal fishing contain many fewer items. For these fisheries, information on the number of fishing gear units used, and on the amount of catches, are required. Data must be submitted for every type of fishing gear separately, showing the maximum number of fishing gear units used during the reported period. In conformity with the general tendency in the Soviet industry to maximum mechanization of production processes, data on catches produced by mechanized fishing gear are singled out from the statistical reports on coastal fishery.

Weight of catches is determined on the basis of documents prepared by fish processing plants which receive catches from fishing ships. These documents are used for estimating the fulfilment of quotas by every ship and for paying ship crews, whose wages depend directly upon the amount of catch.

The term "weight of landing" is not used in the statistical reports of the Soviet fishing industry. They include only the following data:

(i) Weight of catch, meaning weight of round fish, not yet subject to any processing, (including cooling in ship's hold).

(ii) Weight of finished products, meaning net weight of the processed and packed fish products ready for marketing.

"Weight of landing" (or "weight of semi-processed products" which is the term accepted in the Soviet fishing industry) is estimated only in the following cases:

(a) when a fishing ship is given quotas for every trip, and

(b) when fishing ships deliver their catches to fish processing plants.

Weight of a catch is determined by converting the weight of the delivered semi-processed products into the weight of round, unprocessed fish. Special conversion factors are established for all the fisheries in a given area. Those factors determine how much fresh round fish (weight of catch) is used for producing one centner of semi-processed products (weight of landing).

Different coefficients are used depending upon:

(a) The kind of fish (gadoid fish, flat-fish, bass, etc.);

(b) the method of cutting fish (with or without head); and

(c) the method of primary processing on board the ship (cooling, freezing, salting).

On the basis of data on the amount of fish delivered by fishing ships, by state fishing teams engaged in the coastal fishery, and by collective fisheries, every plant of the fishing industry submits to its head office a "Report on catch and purchase of fish and sea animals". Such reports are submitted monthly and include data on the amount of catch for the reported month and from the beginning of the year.

Data on catches are grouped by species.

The methods used in the U.S.S.R. for determining the composition of catches by species are somewhat different from those used in a number of other countries or by FAO. The main difference is that in the Soviet statistical reports the catches of flat-fish or gadoid fish are not divided by species. That is done because there is no difference in wholesale or retail prices for products made of fish belonging to various species of the flat-fish and gadoid families. The prices for gadoid and flat-fish differ only, depending upon the grounds from which they come. The only exception is made for navaga which is produced by the coastal fishery and is much more expensive than other gadoid fish.

The "Reports on catch and purchase of fish and sea animals" are the main statistical documents of the Soviet Fishing Industry, showing the amount and composition of catches by species. These reports are used as a basis for estimating to what extent the actual amount of the catches and their composition by species correspond to the accepted target figures.

The data on composition of catches are sent first to scientific institutions for thorough analysis. On the basis of this analysis the scientific institutions give their recommendations to the organizations of fishing industry concerning the measures which might ensure realization of their programs.

The "Reports on catch and purchase of fish and sea animals" show how much fish was produced by state fisheries and how much was purchased by the state fish processing plants from collective fisheries. The trends of development of the two sectors of Soviet fisheries - the state-owned and collective fisheries - in a given region can be established from these data.

Statistics of Production of Fish Commodities

Statistical reports on the amount and choice of fish products are submitted monthly by all the fish processing plants and organizations of the fishing industry. These reports include data on the amount and kinds of fish products produced in one month, in one quarter, and from the beginning of the year.

The variety of fish products included in these reports depends upon the specific local conditions of the given fishing area, and in particular, upon the composition of catches by species, upon the type of fish processing plants available, etc. However, there is a minimum list of fish products which must be included in such reports.

The following fish products are included:-

(a) Fish, live and cooled.
(b) Frozen.
(c) Canned.
(d) Salted herring.
(e) Salted fish.
(f) Marinades and spiced salted fish.
(g) Sun-dried and dried.
(h) Smoked.
(i) Cured fillets of sturgeon (balyk).
(j) Cooked products.
(k) Caviar.
(l) Other eatable products.
(m) Oil.
(n) Fish meal.
(o) Other inedible products.

Data on all the products, except canned goods, are given in metric centners. Production of canned goods is given in thousands of conventional cans. (A conventional can is a can of 353.4 cu. cm. capacity, containing 350 grams of fish product, net weight.)

There are two terms used in the Soviet fishing industry for determining the amount of output, namely: gross output, and commodity output. Gross output is estimated by simply adding the amount of output produced by all the plants or organizations.

Individual fish processing plants belonging to one organization turn over to each other a considerable amount of their output for further processing. For instance, a refrigerating plant turns over its products to a cannery for processing them into canned fish. A plant engaged in salting herring turns over its products to a curing factory for further processing. Such passing over of semi-processed products by one plant to another is called "internal turnover". Not only individual plants belonging to the same Economic Council turn over their products to each other for further processing. Such a "turnover" takes place between various Economic Councils as well.

The term "gross output" is used for determinining the amount of work done by fish processing plants,however, it cannot be used for determining the amount of commodities going to the market. That is determined by the term "commodity output".

In order to estimate the amount of commodity output, the "internal turnover", i.e., the amount of products turned over by one plant or organization to another, is deducted from the total amount of gross output. Referring to the example cited above, the amount of frozen fish turned over to a cannery must be deducted from the total output of frozen fish. In the report on commodity output that fish will appear not as frozen, but as canned fish, that is in the form in which it went to the market.

All the statistical data, showing the amount and choice of the fish industry output, are the data on commodity output.

The fishery organizations conclude contracts for sale of their output with trading organizations on the basis of their commodity output plans.

The statistic data on the amount and choice of commodities produced by various plants and organizations are used as major indices, showing how these plants and organizations are managing to solve the main task facing the fishing industry. That task is to ensure steady increase in the amount, and improvement in the choice of its products to meet the rapidly growing demand for high-quality fish products in the country. The list of fish products which are included in statistic reports, was drawn up in conformity with this task. In recent years the demand for slightly salted herring has been growing rapidly, whereas the demand for strongly salted herring has somewhat decreased. Accordingly, target figures for production not of salted herring in general, but of the above-mentioned two varieties of salted herring, taken separately, are now included into the output programs of fish processing plants in the two major herring-producing areas - the North Atlantic and the Far East. In statistical reports, the data showing production of those two varieties of salted herring are also being singled out.

The data on gross output are used for estimating how the production capacities of the processing plants are being used. By comparing the data on gross output of frozen fish with the production capacities of the refrigerators available, it is possible to determine the efficiency of utilization of freezing and refrigerating storage rooms at refrigerator plants or on board ships, belonging to a given plant or organization.

Statistics of Factory-ships and Mother-ships Operations

In the Soviet fishing fleet the big-size freezing trawlers are known as factory-ships. These ships, as it has been mentioned in part 1 of this report, are engaged not only in fishing, but also in processing fish, delivering finished products ready for marketing. There is no special system of statistical reporting for them. Catches are estimated by converting weight

of products landed into round fish weight using special conversion factors, and production is estimated just as production of the land fish processing plants.

The Soviet mother-ships are used to serve the middle-size trawlers engaged in herring fishery in the North Atlantic. The size of catches of these trawlers, in estimated from reports submitted by captains of the trawlers. The fished herring is salted on board the middle-size trawlers. The salted herring is periodically delivered, as semi-processed product, to mother-ships, where it is either:

(a) subject to further processing (sorting out by size, and by degree of salinity, adding herring and brine) and then landed as finished product, or

(b) kept in the holds of the ships until their return to the port, where it is turned over to land plants for further processing.

Data on the amount of finished salted herring are submitted by mother-ships, in cases when they land finished products, or by the land fish processing plants, in cases where they land semi-processed products.

Such a system excludes the possibility of duplicating data on the amount of finished products and ensures exact estimation of their actual amount.

2.5.3 CONCLUSIONS

24. The Meeting examined the statistical requirements of this group of users in the light of the contents of these contributions, and agreed that for supplying their long and short term needs, they require statistics of input and output for all phases of the industry in both physical and monetary terms. Their broad requirements are therefore of the same general nature as those of the fishery economist and/or fishery scientist, as outlined in Sections 2.2 and 2.3 respectively. It was recognized, however, that their functions often demand very short term statistics, or statistical indices (often on a day-to-day basis), especially of production, marketing and distribution. This made special demands on the methods of statistics collection and dissemination rather than on the kind of statistical data. It was also agreed that rough short term measures or estimates of total outputs and inputs were often sufficient for fulfilling these functions.

25. Although the administrator's and businessman's activities are concerned mainly with national statistics, attention was also drawn to the importance of international trade statistics (import and export) to them, and the Meeting agreed that the present publication of these statistics by FAO should be continued, and, if possible, extended in scope and coverage.

2.6 STATISTICAL REQUIREMENTS OF FAO, ICES, AND ICNAF

2.6.1 GENERAL REMARKS

26. Amongst the functions of the three international organizations which co-sponsored the Meeting, the publication of statistics is of major importance. The Meeting was therefore concerned, not only with determining the kinds of statistics required by the main categories of users, and the ways and means of collecting and disseminating them at the national level, but also with the problems confronting the national statistical offices and those of these three organizations, in reporting them at the international level. These problems were dealt with under Agenda items 6 and 7, in the light of information provided in documents:- WP/7, "Fishery Statistical Requirements of FAO"; WP/8, "Fishery Statistical Requirements of ICES", and WP/9, "Fishery Statistical Requirements of ICNAF". Excerpts from these papers, outlining the major functions, responsibilities, statistical services and current difficulties in statistics reporting of these organizations, are presented below.

2.6.2 CONTRIBUTIONS

27. A. "FISHERY STATISTICAL REQUIREMENTS OF FAO" (L.P.D. Gertenbach) 1/

Introduction

The UN Conference on Food and Agriculture held in 1943 in Hot Springs, Virginia, established an Interim Commission, which, during the next two years, prepared reports by five technical committees to establish the nature and the functions of the proposed organization, and to draft its constitution. Among the subjects covered by these technical committees were fisheries and statistics.

After FAO was established by the Quebec Conference in October 1945, it has now developed into a specialized agency with an integrated, regular program, financed by the annual contributions of the member countries, and an expert technical assistance program, financed by grants from the Technical Assistance Board in New York. The program of work, and the budget to cover these activities are determined at the FAO Conference, whose sessions take place biennially, around October/November. At this conference, the program is submitted by the Director-General for approval by the delegates representing the member states.

FAO's present requirements for fishery statistics have, therefore, to be considered against the framework of the program of work and budget established by the Conference for the Fisheries Division. A great deal of the statistics used are collected on an ad hoc basis, in the light of the needs of a particular item in the program. In the subsequent paragraphs

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1/ FAO, Rome, Italy.

of this paper, there will be a brief reference to these kinds of data, but the main stress will be on the statistical series that are collected regularly on an annual basis by the Statistics Section of the Fisheries Division, whose main task is the preparation and publication of the various volumes of the Yearbook of Fishery Statistics.

FAO's General Needs for Statistics

(1) General

In view of the close co-operation between FAO and the governments of the member countries, it is obvious that FAO's needs do not differ in substance, but only in detail and in coverage of the statistics required, from those itemized for governments and business in North America, North-West Europe and in other parts of the world, and by research biologists and research economists. For a description of these needs by national governments and private business, see papers WP/2, WP/3, WP/4 and WP/5 in this volume.

(2) Fisheries Biology Branch

This branch makes use of statistics of catch from different territories, especially the species composition, the seasonal catch etc. It is particularly interested in long-series statistics of this kind, covering as many years as the raw data are available. These statistics can usually be obtained from the Yearbook of Fishery Statistics. However, the Biology Branch is also concerned with operation statistics and the catch statistics by fishing areas, and other data relating to the physical input/output relationships. These data have to be obtained from national publications or those of regional commissions and councils such as ICES and ICNAF.

Should FAO's work be extended to cover statistics relating to fishing areas and to input/output statistics on an international basis, or should this work be left entirely to regional bodies, to achieve inter-regional comparability by establishing appropriate standards to be adopted by these regional authorities in collecting and publishing such standards, i.e. instead of FAO collecting international statistics, ICES and ICNAF may, in a joint publication, present this kind of data.

It will also be useful to know exactly to what extent the FAO Yearbook of Fishery Statistics should be extended in coverage, and what should be left entirely to individual publications or to joint publications of two or more of these regional bodies.

(3) Technology Branch

Staff of the Technology Branch have a need for statistics on an ad hoc basis, to enable them to appraise the significance and the magnitude of particular problems in the technology field. In the field of gear technology and fishing methods, there is a need for statistics on catches and on their species composition in different parts of the world. There is also a need for details about the different kinds of fishing gear used, their relative efficiencies and importance; the composition of the fishing fleets in the different parts of the world, etc. The fish processing technologists have a need for statistics on fish landings, the disposition of such quantities and the production of the different kinds of fishery commodities, the international and domestic trade in fishery products, costs and prices. It must be stressed here that a great deal of the statistics are used more or less as background material to "size up" particular problems in order to determine priority in technological development work.

(4) Economics Branch

The Economics Branch makes use of a great deal of the statistics currently published in the various sections of the Yearbook of Fishery Statistics.

FAO has to prepare annually an appraisal of "The State of Food and Agriculture", and the Branch contributes to this document a section concerning current trends and problems in fishery commodities, and therefore, needs annual statistics on catches, landings, disposition, production of preserved and processed commodities, and statistics on international trade and prices. The information needed is not only that appearing in the statistical series of the Yearbook, but also the textual data appearing in weekly, monthly and quarterly reports.

Very closely related to this commitment are the reports submitted to the various sessions of the Committee on Commodity Problems. This covers brief reviews of the current situation and trends in the field of fishery commodities, and needs the same information used for the Study of Food and Agriculture.

In co-operation with national administrations, to assist in the development of the fisheries in the less developed economies, the Economics Branch secretariat requires statistics on catches, landings, composition of landings, disposition, production, international trade, domestic marketing consumption, prices, costs, etc. This kind of information is taken either from the Yearbook, or is collected on an ad hoc basis. Unfortunately it is not usually available for the country to be studied, or concerning the problem that has to be faced in the particular country, but similar material from developed countries with adequate fishery statistical systems provides background material for the assessment of these problems elsewhere.

Yearbook of Fishery Statistics

(1) General

Work on the first Yearbook of Fishery Statistics started in 1947, and since then, 8 volumes have been issued, covering statistics on catches and landings, values of landings, disposition of catches, output of preserved and processed fishery commodities, fishing fleets, whaling activities and results, imports and exports, etc. A complete list of the Yearbooks published or to be released up to and through December 1961 is given in Annex J.

Before discussing, in detail, the FAO requirements and the difficulties experienced in each of the fields covered by the Yearbook, a few of the overall problems encountered by FAO in its annual preparation of the Yearbook deserve comment.

FAO attempts to issue by October of each year, series of statistical data including the preceding calendar year. So that the manuscript is ready for delivery to the printer on 30 September each year, it is necessary to obtain from countries all over the world, as soon as possible after 1 June, the data for each year, including the last full calendar year. By the end of August, all figures have to be corrected and inserted, and work on calculating totals has to commence. The late arrival of data complicates the time schedule, and threatens to delay the publication of the Yearbook. It is therefore absolutely essential that steps should be taken to ensure prompt national replies.

In order to help the countries to expedite their answers, and to reduce the workload in the national offices in preparing the tables to be dispatched to FAO, a great deal of work is undertaken to prepare individual questionnaires, tailored to the statistical records of each particular country. These tailored questionnaires are often completed as they are, without any attempt being made in the national offices to ensure that FAO has included all the items appearing in the national publications. It is particularly important that the national offices should control the FAO list, to ensure that there are no omissions, especially of those items which have been included in the national statistical systems since the last national publication was released.

Where revisions have to be made of the data submitted by countries in previous years, it should not be impossible to let FAO have these revisions quite early in the year, and to submit at a later date preliminary data for the last year. This would enable the secretariat to correct and make additions for the back years, whilst awaiting the data for the last year covered by the Yearbook.

Some of the general problems experienced by FAO in the collection of data and the extraction of statistical material for national reports, are discussed in paper SP/5 and SP/6.

(2) Catch and Landings Statistics

FAO, in trying to obtain data to be published in the Yearbook of Fishery Statistics, asks countries for annual data on a calendar year basis, for the following:

(i) Total nominal catch on a live weight basis, broken down by FAO groups and sub-groups of species.

(ii) Total landings on a landed weight basis, broken down by the individual statistical items, appearing in the national tabulations and rearranged according to the FAO fishery statistical classification of aquatic animals and plants - this classification consists of groups and sub-groups of species.

(iii) The value of total landings, broken down for each of the statistical items in the national tabulations and arranged according to the FAO fishery statistical classification, in terms of groups and sub-groups of species of aquatic animals and plants.

Although the national statistical items are condensed because of reasons of space, sufficient detail is retained at the national level to ensure that the Yearbook is a bridge between different national publications. International comparability, however, can only be made at the group and sub-group level, but because of the identical species caught by countries in the same regions, species details are comparable within the regions.

(3) Disposition Statistics

FAO has been asking the national statistical offices to supply data on the annual disposition of the catch on a live weight basis, with the details broken down by groups of species. It appears that they are experiencing many difficulties in making the estimates required. However, if the conversion factors (yield rates and extraction rates) could be improved, it might not be so difficult to fulfil this requirement, provided that accurate statistics are available on the production of preserved and processed fishery products. In making estimates for the disposal of the world catch,

FAO uses approximate conversion factors to convert to a live weight basis the world totals for the various types of preserved and processed products. The balance of the catch is then estimated on a fresh state basis. It may very well be that this approach is feasible only when working with very rough aggregates for the world as a whole, and it may not be so satisfactory when applied to national statistics which have also to consider imports and exports.

(4) Preserved and Processed Fishery Commodities

Section F of the Yearbook of Fishery Statistics consists of 21 tables, presenting the annual output, by countries, of the various fishery products. In each table the national totals are comparable, but the further breakdown of the national figures retains the national pattern and statistical itemization. The national details presented in these tables are arranged within the groups and sub-groups of the FAO fishery commodity classification.

(5) Fishing Craft

The statistical problems related to fishing craft concern mainly the comparability of the data from different countries. These problems are discussed in paper SP/2.

(6) Import and Export Statistics

Although FAO has not prepared or issued a volume of the Yearbook covering international trade statistics for some years, now that volume VIII, containing data through 1957, has been published, it is intended to produce an international trade volume every two years, compared with the annual preparation of a production and fishing craft volume.

In the tabulation of import and export statistics, the national items are arranged, as far as possible, according to the FAO fishery commodity classification. This procedure permits comparison between the statistics on the production of preserved fishery commodities and the import and export trade data of the countries.

Some Questions Arising in Connection with the Publication of the Yearbook of Fishery Statistics

Although the demand for statistics by FAO for inclusion in the tabulations of the Yearbook of Fishery Statistics could be considered to be an FAO requirement, it must be stressed that the Yearbook is not compiled to meet FAO internal needs only, but mainly to meet the needs of users outside FAO in national offices, government and business circles, etc. It is not possible therefore, to give an adequate description of the so-called FAO requirements for statistics without knowing what are the requirements of outside users so far as such an international Yearbook is concerned. FAO, therefore, looks to this meeting of experts from national offices to indicate what the coverage of the Yearbook should be, what they expect from such a publication and to what degree it falls short of their expectations, and also to indicate how its coverage could be improved and adjusted to these requirements. At the same time, when indicating such requirements and changes in the Yearbook, attention should be paid to the ways in which FAO can best obtain the data from the national offices.

A possible way in which the Yearbook could be improved is by an extension of the coverage of the tabulations, to include, for example, an historical section 6 of volume IV, part I. It is not possible to reproduce such a set of historical tables every year, but it might be possible, with the assistance of the national offices, to take each of the FAO groups of species in

turn and publish for the individual species belonging to a particular group, historical series dating back, say, to 1900. However, the publication of adequate long-term series covering some 50/60 years should only be undertaken if there is a sufficiently strongly felt need for them, which would warrant the national offices making the necessary historical research to obtain these figures from their old publications, which might be available to them, but not to FAO's library.

It might also be considered that the Yearbook could be improved by including internationally comparable data on the numbers of fishermen. This, however, raises questions on how to treat part-time employment in the fishing industry.

Another topic which could be covered by the Yearbook, provided there is a demand for it, is the provision of price series for the various types of fishery commodities which are sufficiently homogeneous throughout the world, to have some international significance.

28. B. "FISHERY STATISTICAL REQUIREMENTS OF ICES" 1/ (A. Fridriksson) 2/

Introduction

When the International Council for the Exploration of the Sea was founded on July 23, 1902, it became an important part of its program to collect and issue reliable and uniform fisheries statistics from its member countries. It must be remembered that the main reason for the foundation of the Council was the problem of overfishing in the North Sea, which, even at that time was noticed, as steam trawling had been operated there for about 20 years. From the beginning, the Council devoted a great deal of attention to the overfishing question, with special reference to the plaice fishery in the North Sea.

At the first preparatory meeting, which was held in Stockholm in June 1899, fisheries statistics were introduced as part of the future program. In the Section C, "Programm für die biologischen Arbeiten" we find the first recommendation concerning statistics: "Es ist der Versuch zu machen, eine Statistik der in den Konsum gelengenden Nutzfische nach einheitlichen Grundsätzen aufzustellen." 3/ In the report from this meeting there are two remarkable items to be noted, namely the recommendation B IIIa and the Supplement 3 which contains a proposal from D'Arcy W. Thompson. The recommendation runs as follows: "It is desirable to collect uniform statistics of the number, weight and value of the fish landed, of the means of capture, and of the persons engaged in the industry: for example as in the General Reports of the Scottish Fishery Board." The proposal of D'Arcy W. Thompson goes considerably further saying: "That in all researches, whether hydrographical or biological, undertaken by the National Institutions or by the Central Organization, it be recognized as primary object to estimate the quantity of fish available for the use of man, to record the variations in its amount from place to place and from time to time, to ascribe natural variations to their natural causes, and to determine whether or how far variations in the available stock are caused by the operations of man, and, if so, whether, when, or how, measures of restriction and protection should be applied."

1/ See also the Report of the Statistical Committee, 49th Statutory Meeting of ICES, Charlottenlund, October 1961.

2/ General Secretary of ICES.

3/ Conférence Internationale pour l'Exploration de la Mer. Stockholm, Sweden, 1899.

The collection of fisheries statistics was considered seriously at every subsequent meeting of the Council. Different countries started to carry out market analyses and the question of under-sized fish discarded at sea was also discussed. The first statistics published by the Council appeared in 1905.

The Council is now divided functionally into a number of subject and area Committees. There are now four Committees covering the whole Council area and there are subject Committees on herring, sardine, scombriform fish, gadoid fish, shellfish and salmon and trout. These Committees are all concerned with the evaluation of the fish stocks and several of them, every year deal with the problem of conservation. The request for improved statistical information originated in these committees and it is in order to meet their needs that the Council is endeavouring to collect the appropriate data. There is, furthermore, a Comparative Fishing Committee dealing with gear and its effects on the fish stocks. All these Committees, which hold meetings every year, are carrying out long-term programs, which are very dependent on statistics and may be altered or extended from time to time should the occasion arise.

From its foundation in 1902 to the ratification of the 1946 Overfishing Convention the Council frequently acted as an advisory body to the member Governments. In many cases the Council has taken the lead, in advising Governments on protecting their national fisheries, in order to secure profitable yields in the future. In 1923 the Council recommended that a region off the continental coast of Europe should be closed to fishing as a nursery for the plaice of the North Sea. It also proposed, in 1946, the closing of the valuable nursery area of Faxa Bay, Iceland, to trawling and seine-netting but neither of these two recommendations have been applied internationally.

However, generally speaking, the Permanent Commission of the 1946 Overfishing Convention has now taken over the function of advising Governments on fishery questions. But, this Commission is dependent on the Council for biological information and it makes use of the Council's statistics, which consequently, have been improved and adjusted according to the Commission's needs. In order to establish the necessary linking machinery between the International Council and the Permanent Commission, the Council has set up a Liaison Committee, consisting of Chairmen of the relevant Committees under the presidency of the Chairman of the Consultative Committee.

Statistical Requirements of the Council

(1) General Remarks

As it appears from what has already been outlined, the Council has spent much effort to acquire reliable, detailed and appropriate fisheries statistics. As the main object of the Council's work has always been the study of the yields of the fish stocks by species and areas, and of the stocks reactions to increasing or decreasing fishing effort and to climatic and other environmental changes, statistics have obviously been indispensable to the scientists of the member countries. Much of the advice which the Council has been able to offer the Governments through a period of more than half a century has been based on the information contained in the statistics collected by the Council. With this fact in mind every effort has been made to arrange for uniformity of collection, compilation and publication of statistical data.

The forms distributed to member countries by the Council for the purpose of collecting fishery statistics and the resulting tables in the Bulletin and the News Letters define the main requirements by the Council for fishery statistical information. One form, for instance, is intended to be used in the collection of information of total catches specified by fishing areas and species, i.e. outputs; another in collecting information on the effort spent (inputs). There are also a number of small tables requiring detailed information.

(2) Output Statistics

With regard to landings, the ICES statistics must be considered to be rather satisfactory. In Tables 2 and 3 of the Bulletin Statistique there are excellent surveys of the total landings of all the member countries of the Council, from the whole Council area and their values for nearly all countries. In Table 4 the landings by species are shown, specified by countries and areas and a survey of the total value of each species, also specified by countries, is included.

It has been pointed out that the Council is mainly concerned with the study of the abundance of fish stocks, their fluctuations and relations with environmental factors and their resistance to fishing. For this, it is not enough to know the size and the composition of the landings; it is of vital importance also to know the amount of fish discarded at sea and its size- and age- composition. The rate of exploitation cannot be defined without knowing both the amount landed and the amount rejected which, together constitute the total catch. Statistics on processing, distribution and consumption are, on the other hand, of minor interest to the Council. In some cases, for example when compiling the results of internal taggings of fish, which are processed in factories, the capacity of the factories and the amount of fish processed, is of outstanding value.

(3) Input Statistics

As shown in the Bulletin Statistique, the Council has collected and published some information of fishing effort. Table 9 of this publication shows that the available material is rather heterogeneous when countries are compared and on the whole, is not very satisfactory. Information is given on the type and size-distribution of fishing vessels operated in each country. In some cases there is a survey of engine power and occasionally an indication is made of the value of the fishing fleet. The number of men employed is also recorded for some countries. In some instances the gear used by the vessels is mentioned but, there is no specification of gear as to fishing areas. In order to compensate for this, Table 7 has been introduced and the main reason for the establishment of the Statistical News Letters was to improve, increase and hasten the collection of effort statistics.

(4) The Requirements

The requirements of the fishing industry output and input statistics, collected by ICES can be itemized as follows:-

(a) They must be comprehensive. As many of the most important fish stocks are distributed over several of the Council's statistical areas, it is evident that the coverage of statistical information must be as complete as possible. It is necessary that it covers the landings from all countries fishing in the various areas. It is sufficient to explain this by pointing out that there is a connection between the herring stocks of the North Sea; cod migrate between Greenland and Iceland and between Norway,

the Barent Sea, Spitzbergen, etc., and herring migrate between Norway and Iceland. The best yields of sardine or mackerel may come from one area one year and from another the following year, therefore wide coverage is required to obtain a general view of the whole situation.

(b) They must be sufficiently detailed. It is often necessary to consider small areas as, for instance, when dealing with the herring fishery of the North Sea where each species or even race of stock must be dealt with separately. Furthermore, information on the morphological and biological features of the stocks is necessary. For this purpose an attempt has been made to secure information of the relative quantities of size categories of certain species. In recent years, an effort has also been made to assess distribution of the catches as to size, age and even maturity and number of vertebrae for herring. The amount of young fish rejected at sea, is also of great interest to the Council. Hitherto, however, it has not been possible to obtain this information from fishing vessels. A special requirement of the ICES is effort statistics, the preliminary result of which appears in the News Letters and in Table 7 of the Bulletin.

(c) They must be exact. It is essential that the information applies to species, and not groups of species. The section marked "Various" should be as small as possible and should not include fish belonging to any of the species dealt with under separate headings. It is also important of course, to record the correct area of fishing and the quantities should be as true as possible.

(d) They must be punctual. Owing to co-operation with the Permanent Commission of the 1946 Overfishing Convention, the punctuality of the submission of statistical information is very much stressed by the Council. In 1954 it was resolved by the Council, to request the member countries to send in the statistics required not later than eight months after the end of the year to which they relate. As it also requires a considerable amount of time to analyze, combine and print the material, more than a year will pass from the end of the period concerned until the publication of the Bulletin, even if the material is sent in as required. Some of the countries are, however, unable to comply to these requirements, as will be mentioned later.

Current Deficiencies and Difficulties

(1) Comprehensiveness

The statistics now collected by ICES can perhaps be said to be sufficiently comprehensive so far as the landings statistics taken by the member countries in the Council area are concerned. It must be strongly emphasized that information is needed concerning that part of the catches which is rejected at sea. Here is a problem which has not yet been solved. The requirements for this kind of statistics have been submitted to all ICES countries but, until now, without any result at all. All the evidence we have for the time being comes from experimental fishing by research vessels. Information of this kind is very much needed because, without it, it is hardly possible to estimate satisfactorily the rate of mortality caused by fishing.

The fisheries statistics of ICES are not as fully detailed as is desired. In some cases the group "Various" (i.e.: kinds of fish which are not specified) is unreasonably large. It appears that in some countries approximately only the half of the catches of demersal species can be divided into species. Of course, a large proportion of the group "Various" contains fish liver and roes, which ought to be included in the live, wet weight and there are species such as sand eel, Norway pout, cuttlefish, starfishes, etc., which are not dealt with in the specified tables.

(2) Exactness

As already indicated the exactness of the statistics should be considerably improved. In many cases catches of species are regularly recorded from areas where they are scarcely even found. This is probably owing to trips where fishing takes place in several areas, or to a few hauls made near the home port on return from trips to distant waters. It also happens that only one species is recorded to have been caught on fishing grounds where several other species would unavoidably be caught as a by-product. In such cases it may be impossible to find out whether the by-catches are included in the records of the main species or if they are neglected.

(3) Punctuality

Some of the member countries of the Council have great difficulties in delivering the statistics in due time. The deadline for submitting material is Sptember 1, but several countries are not able to comply to this request. This is a bad handicap because it is not possible to prepare the tables which are intended to give the valuable, annual survey before all the material has been received.

(4) Other Requirements

In addition to the items mentioned above much better information is needed concerning fishing effort, and such information should be standardized as far as possible in order to allow for comparison. The forms submitted to the countries should be duly completed and care should be taken, by the organizations requiring information, to save the countries from unnecessary overlapping and wast of both time and money. It is also important not to ask for too much. More detailed information is needed especially on the relation between inputs and outputs. In the statistical tables, the group "Various" should be as limited as possible. Alternatively, an analytical survey of this group should be supplied in order to indicate its contents. Punctual submission of statistical material should particularly be stressed.

The difficulties encountered in many countries are usually due to an ineffective system for the production of fishery statistics or lack of available funds to carry out the collection with the necessary efficiency and speed. These difficulties will be eliminated when the importance of fishery statistics is realized by all parties concerned.

The ICES' Statistical Publications

(1) Statistical Publications

There are three series of statistical publications, i.e., the Preliminary Surveys, the Bulletin Statistique and the Statistical News Letters.

(a) The Preliminary Surveys. The third volume of the Council's main publication, the Rapports et Procès-Verbaux, which appeared in 1905, both in an English and German issue, contains two appendices, J and K dealing with statistics only. They appeared under the joint heading: "Statistics of the North Sea Fisheries" and were reprinted as Part I and II. Part I, by P.P.C. Hoek and H.M. Kyle deals with "The Fisheries of the Various Countries" and Part II, which is compiled by H.M. Kyle, carries the sub-heading: "Summaries of the available Fisheries Statistics and their Value for the Solution of the Problems of Overfishing". Part I contains an excellent review of the existing fisheries statistics in Belgium, Denmark, England, France, Germany, Holland, Norway, Scotland, Sweden, and there is a supplement on "The Fisheries on the Murman Coast (North Russia)". In Part II the national data contained in Part I are analyzed and summarized.

(b) The Bulletin Statistique. At the third Council meeting in Hamburg in February 1904 it was decided that the Bureau should undertake the elaboration and publication of an annual bulletin on fisheries statistics from the member countries. The first volume appeared in 1906 and referred to the years 1903-4. It was divided into two parts, comprising General Statistics and Applied Statistics. Here, for the first time, is given a fairly full account of the catches taken in the sea fisheries in the countries of "Northern Europe" measured in metric weight units. In the first part, the total quantity and value of the catches in each country are indicated and a survey is made of the quantities taken in the various areas, specified by the most important species. Furthermore, monthly landings of herring, cod and flatfishes from the North Sea, are recorded. In the second part, which deals with "Applied Statistics" data on fishing effort and catch per unit of effort are recorded. A Statistical Committee was set up by the Council in 1905 to review its statistical requirements from year to year.

The Bulletin Statistique has changed its appearance from time to time during more than 50 years of its existence. Only a few points are mentioned here. As early as the second issue section II was omitted, but in Volume 3 (for 1906) a very useful table appears for the first time giving the "Monthly Quantities of the Principal Species of the North Sea Fisheries with Percentage of Small." In 1917 D'Arcy W. Thompson became the Editor of the Bulletin and held the office for twenty years. He divided the paper into the two main sections, which have been maintained since then: I. Brief Summary of the Statistical tables, and comparison with earlier years; and II. General Statistics. In Volume 9 the bi-lingual text was replaced by a unilingual one, and diagrams were introduced. At a later stage (1932), all the area tables were combined into one large table, showing the landings of each species specified by areas and countries. In 1930 (Vol. 18 for 1928) a very important amendment was made by the introduction of a table showing the catch of certain fish, per days' absence, by steam trawlers fishing in the North Sea. From this small beginning the effort statistics for the North Sea were considerably expanded until, owing to the outbreak of the war, the discontinuation of these statistics was necessitated. Many years passed until effort statistics could be introduced again. They are now found in Table 7 of the Bulletin (since 1954) and comprise nearly all areas fished by the Council's member countries.

(c) The Statistical News Letters. A resolution passed at the 44th Statutory Meeting of the Council in October 1956, reads as follows: "The need for detailed effort statistics concerning the herring fishery in the North Sea was emphasized. These statistics should, as far as possible, be broken down into small areas and months." Action on this recommendation was immediately taken with the establishment of the Statistical News Letters. The letters have been duplicated, as these statistics should be collected and published as soon as possible after the end of the period to which they relate. The material contained in the News Letters is primarily required by the Liaison Committee of the Council, for the benefit of the Permanent Commission of the 1946 Overfishing Convention.

At the Council Meeting in October 1957, the following resolution was passed: "The importance of the request from the Liaison Committee for prompt publication of length and age data for all protected species was recognized and it was agreed that the Secretariat should undertake the collection of these data for protected species and the herring from member countries with a view to their being published promptly and regularly in the 'Statistical News Letters'". A beginning was made by the collection of length and age data for herring (1954-57), cod (1954-56), haddock (1954-58), whiting (1954-58) and plaice (1948-58). A special volume (No. 3) deals with long-term whiting statistics collected by the Council.

(d) ICES' non-statistical Publications containing Statistics. Besides the above-mentioned publications which are devoted entirely to statistics, a number of articles dealing with fisheries statistics, has been published in the Annales Biologiques, Journal du Conseil, Publications de Circonstances and the Rapports et Procés-Verbaux.

29. C. "FISHERY STATISTICAL REQUIREMENTS OF ICNAF." (R.S. Keir) 1/

Introduction

The preamble to the Convention describes it as "a convention for the investigation, protection and conservation of the fisheries of the North-West Atlantic Ocean, in order to make possible the maintenance of a maximum sustained catch from those fisheries".

In Article VI of the Convention, which deals with the scientific aspect of the Commission's work, it is written: "The Commission shall be responsible in the field of scientific investigation for obtaining and collating the information necessary for maintaining those stocks of fish which support international fisheries in the Convention Area". In paragraph 1b of Article VI specific reference is made to statistical data as follows: ("That the Commission may) ... collect and analyze statistical information relating to the current condition of the fishery resources of the North-West Atlantic Ocean..."; and later in paragraph 1f ("that it may) ... publish and otherwise disseminate reports of its findings and statistical, scientific and other information relating to the fisheries of the North-West Atlantic Ocean, as well as such other reports as fall within the scope of this convention".

1/ Biologist-Statistician, ICNAF.

Paragraph 3 of this Article goes on to state that "The Contracting Governments shall furnish to the Commission at such time and in such form as may be required by the Commission, the statistical information referred to in paragraph 1b of this Article".

The responsibility for reviewing the status of the fisheries of the five sub-areas (see map) into which ICNAF area is divided was delegated (in part) to five Panels, whose terms of reference were given in Article VII of the Convention, of which the first two paragraphs were:

> "Each Panel... shall be responsible for keeping under review the fisheries of its sub-area and the scientific and other information relating thereto.
>
> Each Panel, upon the basis of scientific investigations, may make recommendations to the Commission for joint action by the Contracting Governments on the matters specified in paragraph 1 of Article VIII."

Article VIII, referred to above describes the kind of regulations which the Commission may recommend and paragraph 1 of this Article is quoted below (the other paragraphs of this Article describe the machinery for transmitting and adopting a proposed regulation).

Article VIII, paragraph 1:

> The Commission may, on the recommendations of one or more Panels, and on the basis of scientific investigations, transmit to the Depositary Government proposals, for joint action by the Contracting Governments, designed to keep the stocks of those species of fish which support international fisheries in the Convention Area at a level permitting the maximum sustained catch by the application, with respect to such species of fish, of one or more of the following measures:
>
> (a) establishing open and closed seasons;
> (b) closing to fishing such portions of a sub-area as the Panel concerned finds to be a spawning area or to be populated by small or immature fish;
> (c) establishing size limits for any species;
> (d) prescribing the fishing gear and appliances the use of which is prohibited;
> (e) prescribing an over-all catch limit for any species of fish.

Finally, Article X, paragraph 1 reads:

> The Commission shall seek to establish and maintain working arrangements with other public international organizations which have related objectives, particularly the FAO and ICES, to ensure effective collaboration and co-ordination with respect to their work and, in the case of ICES, the avoidance of duplication of scientific investigations.

The emphasis of interest of the Commission in fisheries statistics is in their application to scientific investigation and assessment of the fisheries. The requirements of the Commission therefore in some measure reflect the state of scientific advance with respect to fisheries research. In the future ICNAF may require even more detailed statistics than it does now, and while the present requirements are such as to call for more extensive use of sampling methods than has usually been the case in the collection of fisheries statistics, it is likely that even greater use of sampling will become necessary, especially in the collection of effort data, the allocation of landings to type of gear in inshore fisheries and the collection of information on the sizes and quantities of the fish discarded at sea.

Because of the Commission's concern with international management and conservation, priority is naturally given to those species which support an international fishery and where the need for management seems imminent, or which are caught incidentally in these fisheries and would thus be affected by conservation measures. Cod, haddock, redfish, halibut and scallop at least can be considered as species for which regulations seem imminent. Flounders and other groundfish would be affected by such regulations. Thus, ICNAF statistical requirements are concerned largely at present with the groundfish and scallop fisheries.

ICNAF Statistical Requirements

The following are recommendations made by the Commission at its Annual Meetings. Where a recommendation has been amended or superseded, only the latest version is given. These recommendations define the ICNAF Statistical Requirements.

Landings and Fishing Efforts:

"That statistics of landings (of groundfish) by species and fishing efforts be submitted and published by gear, month and subdivision." 1955 (5th Annual Meeting).

"That the following (size) classification of fishing vessels be used in submitting statistics: For otter trawlers, long liners and dory vessels

Group 1	0- 50	gross tons
Group 2	51-150	gross tons
Group 3	151-500	gross tons
Group 4	501-900	gross tons
Group 5	901-1800	gross tons
Group 6	over 1800	gross tons

1954 (4th Annual Meeting)

"That the Commission compile and publish its statistics in terms of metric tons round fresh weights (weight of entire fish as they come from the water)". 1952 (2nd Annual Meeting).

"That the Contracting Governments be requested to submit statistics in terms of fish in the state in which they are first weighed and to provide the Commission with conversion factors necessary to calculate round fresh weights." 1953 (3rd Annual Meeting).

"That in cases where a species is landed in more than one state and where it is not possible to report the state in which first weighed, an estimate should be supplied of the approximate quantities landed in each state." 1954 (4th Annual Meeting).

"That in order to provide the Commission with up-to-date information each participating Government be urged to report, at least one month before the next Annual Meeting, statistics on its landings of each species from each sub-area, together with such other statistical information as is then available." 1953 (3rd Annual Meeting).

"That member countries use a sampling scheme to obtain estimates of the breakdown of inshore landings by gear used, until adequate collection systems can be evolved." 1959 (9th Annual Meeting).

"That all Contracting Governments in submitting statistics, where the fishing effort is directed toward more than one species, allocate the effort where possible by species (i.e., cod, haddock, redfish, or halibut)." 1954 (4th Annual Meeting).

"That catch and improved effort statistics for the Canadian and United States vessels fishing (for scallops in Sub-area 5) be collected for as small time and area sub-divisions as practicable." (The unit of time used is the month; the unit of area, 10' Latitude by 10' Longitude.) 1958 (8th Annual Meeting).

"That, in addition to present statistical requirements the Secretariat request governments to submit summary statistics on landings of all species by sub-areas. It is intended that the landings be broken down by species where practicable." 1955 (5th Annual Meeting).

Special Studies on Indices of abundance:

"That in cases where special studies are carried out on indices of abundance, these indices be submitted as supplementary information appended to the annual statistical report submitted to the Commission." 1954 (4th Annual Meeting).

Economic and Other Factors:

"That in view of the importance of economic and other factors (e.g., ice conditions) on influencing catches, governments be requested to provide a brief commentary on the operation of such factors when submitting their statistics annually to the Commission." 1952 (2nd Annual Meeting).

Discards:

"All countries should collect and report to the Commission records of the quantities, species and sizes of fish discarded at sea." 1956 (6th Annual Meeting).

"That, where possible, special logbooks should be placed on board vessels by all member countries for the collection of discard statistics by weight and species." 1959 (9th Annual Meeting).

"That as precise estimates as possible of the quantities of redfish, halibut, flounders, and other groundfish discarded by the cod-fishing fleets be reported to the Commission." 1959 (9th Annual Meeting).

Size Compositions of Catches and Discards:

"That all countries should engage sea observers to accompany commercial vessels fishing in the ICNAF area to provide age and length data of the entire catches including the fish discarded as well as the fish retained, for each of the statistical regions fished." 1958 (8th Annual Meeting).

"For each species sampled each country should report to the Secretariat the sizes, ages and weights and sexes of fish sampled by place and time of capture. The Commission should publish these statistics. 1956 (6th Annual Meeting).

"In submitting statistics to the Secretariat countries should give, for each length and age frequency, the number of samples, number of fish in the samples, mean weight and total estimated number of fish in the landings from the ICNAF statistical unit to which the frequencies refer together with mesh or hook sizes. Redfish data should be presented by sexes; and depth zone should be recorded." 1959 (9th Annual Meeting).

"Countries should report length and age frequencies in numbers per thousand." 1959 (9th Annual Meeting).

"Cod length frequencies should be published in 3 cm. groups (39-41, 42-44 cm, etc.), haddock in 2 cm. groups (34-35, 36-37 cm., etc.) and redfish by centimetres. Countries should report data in these standard groupings or by centimetres." 1959 (9th Annual Meeting).

Numbers and Sizes of Vessels:

"That the participating governments be requested to report in summary form information on the number of vessels of various types and sizes fishing in the Convention Area during each year and that, to provide the basis for classification of fishing vessels, each government report the name, gross tonnage, horsepower, and type of fishing gear for each vessel fishing in the Convention Area in 1953." (The latter half of this recommendation was amplified in subsequent recommendations which are quoted below.) 1953 (3rd Annual Meeting).

"That countries be asked to supply every three years a list of their vessels fishing in the Convention Area to keep the Commission's records up-to-date and to furnish a basis for reviewing the classification of vessels used in submitting statistics." 1954 (4th Annual Meeting).

Information on the following items should be given for each vessel in the above list to assist in the study of factors affecting fishing power (as amended at the 9th Annual Meeting):

Name of Vessel
Date built
Gear used
Gross tonnage
Overall length
Register number
Home port
Engine and fuel
Indicated horse power
Range or fuel capacity
Name and size of net or other gear
Number of crew

Information on the following items:

Radio
Radar
Echosounder
Echoranger (Asdic)
Loran

Controllable pitched propeller
Automatic navigator (Decca)
Automatic pilot
Radio direction finder (D/F)
Newly developed types of equipment
Sub-areas fished

Mesh sizes and chafing gear:

"That collection of mesh sizes of trawls used by all countries in the ICNAF area should be carried on permanently and that the Secretariat should collect such data." 1956 (6th Annual Meeting)

"That member countries should report upon the use of chafing gear at the next Annual Meeting." 1957 (7th Annual Meeting).

"That the Committee on Research and Statistics should solicit information on the forms of chafing gear which are used in regions of the North Atlantic outside the Convention Area." 1957 (7th Annual Meeting).

"That, since specially designed standard forms will speed up reporting and processing as well as ensure that all requirements are met by member countries, prescribed forms should be prepared by the Secretariat and sent out to member countries when requesting statistical and sampling submissions." 1959 (9th Annual Meeting).

Processing and Publishing of ICNAF's Fishery Statistics

ICNAF publishes its statistics in three series:

(i) Statistical Bulletins: published annually.
These volumes contain data on the landings and fishing efforts of the fleets fishing in the Convention Area.

(ii) Sampling Yearbooks: published annually.
These contain a summary of all data on length and age compositions of catches, landings and discards reported to the Commission. They deal mainly with cod, haddock and redfish.

(iii) List of vessels of over 50 gross tons fishing in the Convention Area: published triennially.
No. 1 (1953) multilithed
No. 2 (1956) multilithed
No. 3 (1959) in preparation.
These list by name all vessels over 50 gross tons fishing in the Convention Area and give for each such data as gross tonnage, length, etc. and specify electronic and other special equipment carried.

The data are supplied by the Contracting Governments and are compiled and published by the ICNAF Secretariat as described below.

Difficulties and Solutions Suggested

"Second only in importance to having statistics and sampling submitted in the detail requested by the Commission is the need to have them published promptly. Increased fishing in the Convention Area and the growing demands for detailed statistics and sampling are making it more difficult for the small Secretariat to produce timely reports to the Commission."
1959 (9th Annual Meeting).

Bulk:

Sheer bulk and complexity of the data is a major problem because statistical staffs and budgets are small. Frequently, staffs are inexperienced in modern data processing systems, and standard data processing systems designed for business use are not always immediately applicable to the situations arising in fishery statistical offices. Definite advances could be made by wider knowledge of small scale data processing and reproducing techniques. The bulk can be reduced by summarizing the data as early as possible in the processing and by reducing the data to essentials.

Some of the bulk of fishery statistics may be caused because the collector is not the user of the statistics and a lack of communication between them causes the collector to waste time with non-essential data. The collector should know precisely, not only the essential data stripped of all unnecessary details but also permissible tolerance limits for accuracy and completeness.

Lack of data:

(i) Incompleteness of Statistical reports:

Frequently, present collection systems do not give complete reports on fishing effort, fish discarded at sea, catches of inshore fisheries, etc. However, once the data requirements and tolerance limits are known a sampling scheme can be designed for any given situation.

(ii) Lack of auxiliary information:

(a) Conversion factors (to round fresh weight)
(b) Power factors - to standardize fishing effort
(c) Gear selection factors.

Non-standardization:

Non-standardization generally arises through a lack of effective communication. Frequently it is of historical origin. Sometimes it is a result of different needs. Usually it can be avoided much more easily than it can be corrected. Rarely in fisheries statistics is it deliberate or unavoidable. However, it occurs repeatedly. E.g., landings are reported in various conditions (gutted salted, round fresh, etc.); species are grouped in various ways; units of length vary (cm., 3-cm. group, 5-cm. group, etc.); area units vary; time units vary; gear classifications vary.

One standardization that would be of considerable benefit would be to have all international statistics of landings in terms of metric tons round, fresh, using conversion factors based on experimental observations.

As a final comment we should note that fishery statistics are often used in fisheries research to obtain estimates of parameters which can either be measured in some other way (e.g., by using research ship observations) or for which some other parameter can be substituted which again can be estimated from other data. Fishery statistics are frequently used because a statistical collection machinery is thought to be in existence which can provide the data and their use therefore calls for relatively little added expense. This may not be the case. In so far as research data requirements become more and more detailed and complex the statistics required become more difficult and expensive to collect and a more direct method of estimation of the parameters may become preferable.

2.6.3 CONCLUSIONS

30. These statements indicate that, at present, the ICES and ICNAF statistical offices are concerned with the publication of input (effort) and output (catch and landing) statistics of the primary phase (fishing industry) for their respective areas only, and in serving principally the statistical needs of fishery scientists. FAO on the other hand has a wider responsibility, as to both the kind of statistics and geographical coverage. Its publications include statistics of the other industry phases, as well as those of the primary phase, and its coverage is world-wide. However, the Meeting noted that many of their tasks and associated problems are the same especially with regard to the collection and publication of primary phase statistics for the North Atlantic region. These tasks and problems were considered in detail by the Meeting under items 6 and 7 of the Agenda, and are dealt with in detail in later parts of this report.

PART 3

PRIMARY PHASE STATISTICS

3.1 INTRODUCTORY REMARKS

1. As mentioned in Part I, the Primary Phase, or fishing industry, embraces the activities concerned with catching, or otherwise taking and landing fish and other aquatic products. Its structure therefore includes the fishing enterprises, fishermen, fishing craft, gear and the shore installations concerned with the craft and their activities, and its operations consist of inputs, in terms of the utilization or cost of labour, craft and gear; and outputs in the form of the quantities or values of catch and landed products.

2. The responsibilities and activities of two of the international organizations co-sponsoring the Meeting, ICES and ICNAF, are confined solely to this phase. It is also the phase with which other international organizations, concerned with fishery conservation and regulation are primarily interested. Further, the responsibilities and activities of fishery scientists are mostly confined to it. In consequence, the structure and operations of this phase have been subjected to close and intensive study and evaluation in recent years both nationally and internationally. This has demanded a detailed and extensive statistics collection and reporting structure. The identification of the current major defects of this system and the ways and means for remedying them, therefore constituted important tasks for the Meeting, and these were dealt with under agenda items 6 and 7.

3. In view of the very wide and complex nature of the whole statistical structure, specific components of it were selected for examination. These are specified in Section 2.4 of this report. They comprise problems concerning operational statistics of inputs and outputs, with special reference to the statistical needs of the specialist users, especially fishery scientists, and with regard to standardizing and simplifying the reporting of statistics by the statistical offices of the international fishery agencies in the North Atlantic.

3.2 INPUTS (FISHING EFFORT, MANPOWER AND PRICE STATISTICS)

3.2.1 GENERAL REMARKS

4. The Meeting paid particular attention to the deficiencies of the present published statistics of inputs (fishing effort) in the light of the urgent, exacting requirements of fishery scientists, and other users and their importance in fishery assessment work. These requirements are outlined in general terms in Part 2, but a more detailed analysis of them, especially with regard to the fishery scientist's needs, was itemized in documents SP/1, "Operation Statistics in Relation to Measurement of Fishing Effort"; SP/9, "The Measurement of Fishing Power and its Relation to the Characteristic of Vessels". 1/ Condensed versions of these documents are presented in Sections 3.2.2 (A) and (B) below. The particular problem of fleet classification was also dealt with in document SP/2, the material of which was utilized by the Meeting in its treatment of the problem of fishing effort measurement; it is not therefore reproduced here.

1/ This paper is published in full in ICNAF Ann. Proc. Vol. 6 - 1958-59.

3.2.2 CONTRIBUTIONS

5. A. "OPERATION STATISTICS IN RELATION TO MEASUREMENT OF FISHING EFFORT" (J.A. Gulland) 1/

Measures of Fishing Effort

The fishing effort of a fishing vessel and gear may be most readily considered as the product of its fishing power (representing the combined size and efficiency of the boat and its gear) and the number or duration of its fishing operations. Within this framework there exist a wide range of possible measures of fishing effort which can be, and are being, employed. This diversity of measures has made the international (or even national) compilation of total fishing effort exceedingly difficult. While there is probably no single measure, even for a single gear, which is suited to all users of effort statistics, it should be possible to reduce the number of measures employed to a comparatively small number which will serve most users and which can be readily collected. These measures will, however, tend to differ for differing types of gear. In the North Atlantic, the area under chief consideration at this meeting, the main types of gear employed include trawls (bottom and pelagic), Danish seines, purse seines and gill nets, and long-lines. In the standard notation of fishery dynamics we can write $F = qf$

where F = fishing mortality coefficient

q = catchability coefficient

f = effective overall fishing intensity, as derived from g, the recorded fishing effort.

Ideally, q should be constant, but some variation, due to weather, etc. is inevitable; small random variations can be accepted, but trends in q with time - due to increase in efficiency, or with stock size - due to saturation in the widest sense, or total amount of fishing - interference between gears - should be eliminated. In the following section the possible measures of effort for each gear will be discussed with particular reference to such trends. It may be useful to distinguish between information which has to be collected and incorporated at the primary stage of the statistics, and adjustments and corrections which can be made near the final tabulation of total effort.

As measured by the catch per unit fishing time on a standard density of fish, the fishing power of trawlers has been shown to be closely related to the size of ship; combined with a general increase in size of trawler (Gulland, 1956, 2/, Lundbeck, 1959, 3/), this would cause a steady increase of q with time. Among the many possible measures of size, gross tonnage is nearly proportional to fishing power, as defined above, and therefore is a suitable measure for those who need fishing effort statistics in fish population studies. At the same time the input (costs) as required by, for example, economists, is also closely related to size of ship, though perhaps not exactly proportional to any single measure.

The measure of fishing effort which would reflect most accurately changes in the fishing power of ships, is one in which a measure of fishing power is ascribed to each vessel, and incorporated at the primary stage of the statistics, e.g. for the United Kingdom in the record of the individual trip.

1/ Fisheries Laboratory, Lowestoft, United Kingdom.

2/ "On the fishing effort in English demersal fisheries". Fish. Invest., Lond. Sec. II. 20 (5); 1956.

3/ Classification in Fishing Fleet Statistics, ESTANA SP/2, 1959.

The data for one trip would then be recorded as so many ton-hours (gross tonnage x hours fishing) or similar form. This adds considerably to the work of collecting and processing the statistics, and is not very flexible. If the required relation between fishing power and size is not simply proportional, or if different relations are required, e.g. by biologists and economists, the work involved is greatly increased. Two simple alternatives have been used; to group the ships by size (as for example in the ICNAF statistics, or to give the average tonnage of the fleet, as in the ICES statistics). Both have disadvantages. Unless the size groupings are very small, and therefore numerous, making the statistics cumbersome, there may be appreciable changes in average size within each group; for instance, within the ICNAF classification 500-900 tons, the average size of English distant water trawlers has increased since the war from not much over 500 to around 650-700 tons. The average tonnage can be calculated either as the arithmetic mean of the whole fleet, or as the mean, weighted by the amount of fishing, measured as number of trips, days at sea, or hours fishing. The best weighting factor is, of course, given by the best measure of the amount of fishing, which for trawlers, would probably be hours' fishing, but to use this would again necessitate considerable labour. Other factors would give misleading results when, as is likely, the time spent fishing per day, per trip or per year varies with the size of ship (Gulland, 1956) 1/. A composite method, grouping by sizes, but also giving the average size within each group is feasible. For this, quite large groups can be used, and the average size computed simply either from the fleet list, or weighted by number of trips, as the variation of amount of fishing per trip is likely to be reduced for ships all within one size class. Accessory gears such as echo-sounder, radar, etc. are likely to cause the effective fishing power to increase with time, but no satisfactory quantitative measure of this has yet been obtained.

Saturation is not likely to occur for trawlers during the actual fishing operation, but the effect can occur in the measure of fishing time. When the fish stock is abundant, relatively less time during a trip, or per day at sea, is spent actually fishing. Measures of fishing time of trawlers used in the North Atlantic include number of voyages, days at sea, days fishing, number of hauls and hours fishing. Hours fishing, and to a lesser extent days fishing, and number of hauls (length of haul may decrease in heavy fishing) are free from the effect of saturation. Of these measures, hours' fishing satisfies the biologists' needs best, but requires information from the individual fishermen regarding his operation. Of the statistics which can be obtained directly at the port, the days at sea are related most closely with the actual amount of fishing, and to the economic input.

For Danish seines no relation between fishing power and size of vessel has been detected (Pope, 1957) 2/. Like trawls there is little problem of saturation or interference. Number of hauls, or hours' fishing are good measures of effort.

For gill nets the obvious measure of fishing power is the number or length of nets. It is possible that saturation may occur (Kennedy, 1951) 3/, but

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1/ Ibid

2/ "Some results on the measurement of fishing power and relative fishing power". Doc. E.8 Joint International Workshop, Lisbon, Portugal, 1957.

3/ "The relationship of fishing effort by gill nets to the interval between lifts". Journ. Fish Res. Bd. Con. 8. (4). 1951

subsequent correction to the tabulated effort can be made for this form of saturation, as far long lines (Gulland, 1955) 1/. The fishing time, expressed as number of voyages is subject to saturation effects, for example voyages of English herring drifters tending to be longer when fish are scarce. Number of hauls would avoid this trouble, though the average duration of haul may also vary with stock abundance. Parrish (1957) 2/ has stated that, for the Scottish herring drift-net fishery, effort is not directly related to length of haul, and the best basic measure of fishing time would seem to be number of hauls, with information on length of haul collected, at least on a sample basis, to give a subsequent correction factor, if necessary. Interference between ships is possible, but is again a problem to be dealt with after processing the basic statistics. At present information on North Sea herring as given in ICES Statistical Newsletters is generally available as number of shots, and also, for Holland and Scotland, as number of nets. For other gill-net fisheries little or no effort data are available, except as number of vessels.

For long lines, the basic measure of fishing power is obviously the number of hooks; saturation is, of course, important, but can, as for gill nets, be corrected provided the average catch per hook is known. At present, in the North Atlantic, data on number of hooks are published in the ICNAF statistics for some countries, including Norway and Canada, but for others only the rather unsatisfactory measures of voyages or days at sea are available.

Ring-nets, purse seines and similar gears, operating on shoaling fish, present a more difficult problem in the choice of the measure of effort. The actual catching operation is limited to a relatively short process of shooting and hauling the net, and the number of hauls is obviously a necessary statistic to collect. However, the catch per haul is a poor measure of the abundance of fish, which is more nearly related to the time the fishing vessel has to search before finding a shoal of fish worth shooting the net on. Effort statistics should therefore include data on the time spent on the fishing grounds looking for fish, as distinct from the time spent fishing or number of hauls on one hand, and time away from port on the other. All of these are liable to severe saturation effect, under-estimating any change in fish abundance.

Sampling of Effort

Two problems often occur in the collection of effort statistics, particularly in a fishery involving several fleets. First, there is the common problem of obtaining complete statistics, especially when the basic data, e.g. hours' fishing, has to be obtained from the fishermen themselves. The second is the combining of effort statistics from two or more dissimilar fisheries, (e.g. trawl and line) exploiting one stock.

The difficulty in obtaining complete statistics is of course most easily overcome by the use of a suitable sampling system. This could be direct sampling for effort, but, at least in the North Atlantic, complete catch statistics are available, and catch is very closely related to effort. An indirect sampling system, in effect sampling to determine the ratio catch effort, is therefore possible. The amount of sampling required will depend inter alia, on the gear being considered; trawlers for instance usually

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1/ "On the fishing effort in English demersal fisheries". Fish. Invest., Lond. Sec. II. 20 ; 1956

2/ "Remarks on some difficulties in effort measurement". Doc. E.6. Joint International Workshop, Lisbon, Portugal, 1957.

have more consistent catch per unit effort figures for different vessels than seiners, and therefore require less sampling. A sampling system would be particularly useful when the information on the amount of effort has to be obtained by special interviews. However, whatever the sampling system, the usual precautions against bias have to be taken. For example, the more co-operative fishermen are likely also to be the more successful fishermen, with a catch per unit effort above the average. Care should therefore be taken to see that fishermen are not omitted from the sample purely because information from them is difficult to obtain. Of course, situations may arise in which it is only possible to obtain information from a few fishermen, and the sample is pre-determinated and far from random. Such information will have to be used, despite the risk of bias, and the extent of the bias possibly evaluated and a correction made on the basis of a separate investigation.

Fishing by more than one Fleet

When more than one fleet is exploiting the same stock of fish, the problem arises of obtaining a single figure for the total fishing effort on that stock. This problem is probably more urgent, but also more easy of solution, for the biologist than for the economist. To the biologist two fishing vessels have exerted the same effective effort on a stock if they have taken the same catch from that stock (ignoring possible complications over differences in the sizes, etc. of the fish caught) even if they are operating at differing times and places. For biological use therefore the relation between catches and efforts of two fleets, in the obvious notation:-

$$E_A/E_B = C_A/C_B \qquad \ldots\ldots\ldots\ldots(1)$$

gives the complete relation; if catch statistics are complete and the effort of fleet A is the known, the formula gives the effort of fleet B at once. In economic terms, however, this relation may conceal important differences in relative capital and running costs, even if the relation between total costs and catches were the same in the two fleets.

Besides total effort as an index of the pressure of a fishery on the stock, biologists also use the ratio of catch to fishing effort for part or all of the fishing fleet as an index of the abundance of the fish stock. In theory this could be given by the catch and effort of a very small section of the whole fleet. The variation in the index is large, due both to random elements - weather, differences in skill of fishermen - and possible trends, e.g. improvements on gear. The random errors will be reduced by collecting information from as large a section of a uniform fleet, while a trend is most likely to be detected by comparison of as many independent indices as possible - i.e. data on catch per unit effort from as many distinct fleets as possible. In mathematical terms, equation (1) may be rewritten as:-

$$N_A = C_A/E_A = C_B/E_B = N_B$$

where N_A, N_B are the two indices of abundance. The best index of abundance will be some mean value of the indices from the different fleets = $\overline{N}$ say. The efforts of the individual fleets and the total effort will then be given by:

$$E_A = {}^1/_{\overline{N}} \times C_A,\ E_B = {}^1/_{\overline{N}} \times C_B,\ E = {}^1/_{\overline{N}} \times C.$$

In many fisheries for historical and other reasons, the best or at least the most convenient, index of abundance will be derived from one fleet.

In the most simple case the formula for the effort reduces to equation (1) in the form

$$E_B = {}^{E_A}/_{C_A} \times C_B$$

Otherwise, more or less sophisticated indices derived from fleet A will be used, for example, corrections for the relative distribution of the fleet and the fish stock (e.g. Beverton and Parrish, 1956 1/).

When two or more fleets are used to give an index of abundance, data from one or more standard years will have to be used to enable the various catch per unit efforts to be expressed in a standard form. Several methods of proceeding are available; the index of abundance in any subsequent year may be expressed as a percentage of the standard year or years, or all the efforts and catch per unit efforts can be expressed in terms of one fleet, e.g. trawlers, seiners and liners in terms of hours' fishing by a standard trawler. Some method of weighting then has to be used; a good one if the efforts are expressed as standard units is to take as the best index of abundance:

$$\bar{N} = \frac{C_A + C_B + \ldots\ldots}{E_A + E_B + \ldots\ldots}$$

This is equivalent to the weighted mean of the individual catch per unit efforts, the weighting factors being the efforts.

6. B. "THE MEASUREMENT OF FISHING POWER AND ITS RELATION TO THE CHARACTERISTICS OF VESSELS" (Biology Branch, FAO, Rome, B.B. Parrish 2/and R.S. Keir 3/)

Introduction

Fishing activities comprise a collection of discrete operations by fishing units (each consisting of vessel, gear and crew). During each operation an input of fishing effort results in an output of catch. Measurement of these two elements - effort and catch - provides the basic information used for the assessment of fish stocks. For this purpose, effort and catch data for single operations have to be combined in such a way that the sum of the catches divided by the sum of the efforts in a given area and over a given period is a proportional index of the average amount of commercial-sized fish present in that area during that time. If it were possible to measure stock abundance directly, and in absolute terms, by the use of echo sounders, underwater cameras, or other such instruments, we should be able to determine the appropriate unit of fishing effort for this purpose. In the absence of such knowledge it has been usual to attempt to foresee the factors of effort variability which could result in non-proportionality of catch-per-unit-effort and fish density. The hypothesis that any given factor does indeed have such an effect in practice is then examined experimentally by the methods described in later sections of this paper; if the factor does not introduce an effect large enough to affect the estimates significantly, then that factor is ignored in further treatment of the data. If, however, an effect is great

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1/ "Commercial Statistics in fish population studies": Rapp. Cons. Explor. Mer. 140 (1). 1956.

2/ Marine Laboratory, Aberdeen, Scotland.

3/ ICNAF Secretariat.

enough to be thus measured, it can be taken into account in devising an appropriate standard measure. It is in this manner that for certain fisheries there has been a progressive modification of the effort unit for trawlers as follows: number of trips, days absence from port, days spent fishing, hours spent fishing, number of steam-trawler ton-hours spent fishing.

The compilation of catches presents no special problems other than the identification of the stock from which they are taken; in general the catches must be of the same kind - species, species group, or perhaps race - and refer to the same condition of product, e.g. whole fresh fish. For the latter purpose, simple conversion by factors is usually satisfactory.

Effort data are not so easily combined. Not all unit operations are quantitatively equivalent; thus one haul by a big trawler obviously does not represent the same amount of effort as one by a small trawler. Because the size composition of fleets vary, because there is a tendency for small trawlers to operate in different places from large ones, and because the species composition and the size composition of small and large vessels differ, some adjustment must be made to the effort units before they can be compiled. Of course, there are many factors other than vessel size which affect catches and which must be taken into account when they vary.

It is therefore necessary to establish standard units of fishing effort so that we may say that on the average x operations by fishing unit A are equivalent to y operations by unit B. By equivalent we mean no more than that if the two units A and B could fish at exactly the same time and place, A would catch in x operations the same amount and kind of fish that B would catch in y operations.

Before examining how such relations are discovered, we should mention two points. Firstly, an aim in selecting effort units is to obtain a measure of effort which is related in a known way, and preferably directly and simply, to the physical characteristics of the system the processes within which are being analyzed. Thus a good unit of effort might be proportionally related to the area of ground or volume of water "covered" or "explored" by the gear during an operation and hence simply related to the probability that a fish present in the area at the time will be captured, and thus be related in a simple manner to the fishing mortality caused in the fish population by each operation.

Secondly, it should be noted that while standard fishing effort measurements are used to determine the condition of the stock and to analyze its dynamic properties of change in size, composition and yield in response to exploitation, the standards might be required to specify desirable amounts of fishing effort if the analysis shows that some control of the fishing activity would be beneficial to the industry, politically desirable and administratively possible.

Definition of Effort

A measure of effort which often satisfies the above conditions is, for any fishing unit, the product of the fishing power of the fishing unit (i.e. its catching power) and the period of time during which it operates. These therefore constitute the two elements of the unit of effort. The total effort exerted by the fleet of fishing units operating in a fishery is the sum of these products for all the units comprising the fishing fleet. The primary tasks in effort measurement for any fishery are therefore first to choose the appropriate time unit for the particular method of fishing engaged in the fishery, and secondly, to measure the fishing powers of the units.

The time unit may refer in cases where fishing is "blind", as with trawlers not carrying fish detection instruments, to the time during which the gear acts; for other kinds of fishing the time spent searching for fish is more appropriate; probably in most cases a function containing measures both of "searching time" and of "fishing time", appropriately weighted, would be better.

In practice, the absolute fishing power of a fishing unit cannot usually be determined, because the absolute abundance of fish in the locality fished is not known. All that can be measured are indices of performance (e.g. catch per unit operation) of the fishing unit under the particular circumstances of the fishing operations. The performance of a unit will vary from place to place and from time to time as a result of variations in the abundance of fish and other external factors, so that this cannot be used as an index of fishing power for computing total effort. Instead, it is necessary to measure relative fishing power, defined as the ratio of the performance of one fishing unit to that of another operating under the same external conditions (abundance and composition of fish, etc.). The total effort exerted by the fleet can then be computed in terms of one component of the fishery (e.g. steam trawlers of a certain size, seiners, etc.), whose fishing power is taken as unity, the effort units of the other components being adjusted by their relative fishing powers. The relative fishing powers may refer to groups within a single class of fishing units (e.g. motor trawlers of different sizes), to classes of units within a single gear fishery (e.g. steam and motor trawlers) or to different components of a mixed gear fishery. The complexity of the task is a function of the heterogeneity of the fleet and the extent to which its composition changes with time or place.

A consequence of this concept of fishing-effort is that separate effort units and relative fishing powers may apply for the different species of fish caught in a mixed species fishery; the relative fishing powers of two units or groups of units may differ markedly for different species of fish.

The Measurement of Relative Fishing Power

The relative fishing power of a unit is the ratio of its performance to that of another unit under identical conditions. The method of measurement must therefore involve the analysis of the catches of vessels working at the same time and place, in their normal manner. An assumption made here is that different units fishing apparently at the same time and place are fishing on stock of the same density. Whether this is so can be tested only by having direct estimates of stock density or by searching for differences in catches, such as their size composition, which would indicate that the different units are really fishing different groups of fish. It is necessary to assume that such a difference does not exist, until it is detected; interpretation of data for fishery assessment purposes does not however usually depend critically on the validity of that hypothesis. In testing it by examination of catch compositions it is necessary to know, and to take account of, inherent differences in the selectivity of the various units.

One method of undertaking such comparisons is by carefully controlled comparative fishing experiments using two or more vessels. With this procedure allowance can be made for the effect of variations in external conditions such as the size and composition of the fish concentrations, the nature of the sea-bed, wind and tide, all of which modify the performance of fishing units. Since many of the characteristics of the fishing units can be carefully measured and controlled, such experiments also provide information on the causes of the observed differences in fishing power.

The relative fishing powers of all units of the fishing fleet could, in principle, be determined from the results of many such experiments on which either one unit is used throughout as standard (e.g. a research vessel) or successive comparisons are made between different pairs of units of the fleet (e.g. A is compared with B, B with C, C with D, and so on). They would be accurate and highly informative, but also time-consuming and costly. For reliable estimates of relative fishing power numerous haul replicates are required in each experiment, and these have to be repeated under different external conditions.

In practice, especially in large mixed fisheries, it may be necessary to adopt a different method of measurement. This is the analysis of the records of commercial fishing operations giving detailed statistics of the catches of each species of fish and efforts of the various fishing units, by short time periods and for small sub-divisions of the fishing area. The performances are compared between pairs or groups of units fishing in the same area at the same time. The applicability and precision of this method for any fishery are governed by the statistical breakdown; the smaller the area and time sub-divisions in which statistics are given, the less is the danger of variable external circumstances influencing the relative performances of the fishing units. This method is less costly and time-consuming than comparative fishing experiments, and estimates can easily be made for all seasons and localities fished. It is not applicable, of course, in fisheries in which the different components of the fleet are segregated on the fishing grounds. This is sometimes the case for the vessels of different countries and those using different types of gear. In such instances, the first method must, if possible, be used to make the comparison between the segregated types of units. In any case it is probably best in practice to employ both methods and compare the results obtained from them.

Where fishing units of similar types but different powers operate on different grounds for such reasons as differences of working range, then comparison of operation statistics cannot give the required estimates of power factors, but in such situations the costlier method of comparative fishing is available. When, however, different gears are used on different grounds for some reason connected with their fundamental method of action, quite a different situation is presented. There are varying degrees of possible segregation, extreme cases being offered by fixed stake traps and otter trawlers exploiting the same stock in adjacent but quite separate areas without any overlap.

Resolution of the problem of the correct procedure in such cases can only come from knowledge of the relative concentrations of fish actually available to the fishing units. Meanwhile, it seems better to use apparent relative fishing power factors derived from catch and effort statistics than not to attempt to bring effort to a common standard, but the implications and consequences of this need further study.

Factors Governing Fishing Power

Ideally, the measurement of total fishing effort exerted in a fishery should involve determination of the relative fishing power of each unit in the fleet. This is seldom possible in practice, and experience has shown that it is usually not necessary. For a large fleet it is impracticable to conduct a comprehensive series of comparative fishing experiments, and in the method of comparing commercial statistics there is a considerable chance variation in the estimated fishing powers of individual units. The fishing powers of

units having similar characteristics with regard to vessel, gear and number of crew, however, are not usually found to differ markedly. That is to say, the differences between the fishing powers of fishing units of clearly identifiable types are greater than the differences between units of the same type which differ in the skill of the skipper or other more subtle ways. The main task is therefore to identify factors closely correlated with fishing power variations within the fleet, and to measure the effects of each.

Some guidance to the identification of these factors can be obtained by a close examination of fishing practices. For convenience, the possible factors might be grouped in the following categories:

(1) Vessel characteristics

(2) Gear characteristics

(3) Crew characteristics (e.g. number, skill in operating gear, etc.)

In practice the various factors in either the same or different categories, will not vary independently. For example, size and power of vessel and type or size of gear often vary together. In such instances, the fishing power might be expressed in terms of that factor which is most easily measured.

The factors of particular relevance for this paper are those falling within the "vessel" category, and it is in relation to these that most fishing power assessments have been made, especially for trawlers. The two most obvious vessel characteristics which have been investigated are "size of vessel" and "propulsive power".

Conclusion

The relative fishing powers of fishing units within a group, together with specifications of the structural and operational features of the fishing units, constitute the basic information with which critical examination of fishing capacity and performance may be attempted, using the techniques of correlation and analysis of variance. The most important criterion of usefulness of a discovered relation for this purpose is whether it is a proportional one, since the adjustment of crude statistics is then a simple routine task.

The factors causing differences of fishing power cannot be identified with certainty by these purely statistical methods but clues may be obtained that can help in the design of critical experiments. Such experiments are in principle the same as the comparative fishing tests except that some deliberate and usually small changes will be made in the structure or operation of one of two otherwise similar units, or the same unit may make alternate operations with and without the modification. This will be done to test a particular hypothesis as to the magnitude of the effect of a particular factor in determining the fishing power of the type of unit being studied. A special case of this kind is a gear selectivity experiment with, say, alternate hauls of a trawl using cod-ends of differing mesh size to test the hypothesis that changes in power ratios with increasing size of fish are proportional to the maximum girth of the fish and hence to its ability to escape through the meshes. It should be noted, in this connection, that such experiments revealed the inter-dependence of selectivity and fishing power;

thus, increasing the cod-end mesh of a trawl to permit small fish to escape can also increase the fishing power with respect to large fish, and this even when the towing speed is apparently unchanged. The relative change in fishing power thus caused differs for different species in the catches so that the species compositions of large fish, as well as the size compositions and the total effective effort exerted by a given fleet, are also altered to some extent.

The increased attention being paid to fish girth in net selection studies is a good example of a change in emphasis in gear research towards closer study of causative factors. There has been little sign so far of a corresponding change in studies of the factors relating to the vessel itself, or to the crew. Only the crudest of physical measures, such as gross tonnage, overall length and horse-power, have been examined for their relation with fishing power of trawlers. It seems opportune now for naval architects and marine engineers to contribute to this work.

Those scientists who have started the kind of work described above have often not been familiar with the several different ways in which the characteristics, such as vessel length or displacement, which they have chosen for consideration are measured in practice; yet one measure of engine power may be much more closely related to fishing power than another. Surely there are other characteristics of craft, perhaps more complex functions of the apparently simple attributes of hull size and engine power and of other attributes, which are more appropriate for scientific studies of fishing power?

3.2.3 PROCEEDINGS

3.2.3.1 GENERAL

7. The specific problems, concerning the measurement and reporting of fishing effort were examined by the Meeting in the light of these contributions, the reports and proceedings of earlier international meetings 1/ and the current difficulties facing the statistical offices of the three sponsoring organizations.

8. The problems fall into two main categories; those concerned with the classification of fishing fleets and fishing units from the point of view of compiling and reporting fishing effort statistics at the national and international levels, and those concerning the kinds and standardization of operational fishing effort statistics, required especially by fishery biologists. These were dealt with by the Meeting under the following headings:-

(a) Classification of fishing fleets and fishing units: types of fish craft and gear with the respect to fishing effort.

(b) Classification of fishing fleets and fishing units: classification within types of fishing units.

(c) Kinds of operational statistics of fishing effort.

1/ See for example "Purposes and Methods in Fishery Statistics" and report and papers of ICES special scientific Meeting on "Sampling" in Rapp. Cons. Explor. Mer. 140, 1956, and the report and papers of the joint international Workshop held in Lisbon, Portugal, 1957.

(d) Standardization of fishing effort statistics.

(e) Assignment of effort to species fished.

Attention was also given to the definition and classification of manpower for statistical reporting, and to the importance of price statistics of inputs for use by economists, government administrators and businessmen.

3.2.3.2 CLASSIFICATION OF FISHING FLEETS AND FISHING UNITS: TYPES OF CRAFT AND GEAR WITH RESPECT TO FISHING EFFORT

9. The Meeting noted that the present systems of fishing unit classification, used by ICES and ICNAF in their statistical publications, while discriminating between methods of capture, do not always differentiate sufficiently nor uniformly between variations within them. Therefore it concluded that an important first task was the setting up of a standard list of fishing craft and gear categories which should be used by member countries in reporting statistics on fishing effort for both inshore and offshore fisheries to ICES and ICNAF. It suggested that a simple two-way classification, based on a breakdown into craft and gear categories, is a sufficient basis for supplying effort data to these interational organizations 1/. It recognized, however, that as a result of developments and changes in the types of craft and gears used in the fisheries in the North Atlantic, additions to, or revisions of this categorization may be necessary from time to time. It also agreed that the international organizations should consult with countries to ascertain the difficulties, and progress in supplying their fishing effort data on this basis with a view to including them in the international publications.

3.2.3.3 CLASSIFICATION OF FISHING FLEETS AND FISHING UNITS: CLASSIFICATION WITHIN TYPES OF FISHING UNITS

10. The Meeting recognized that, in addition to the breakdown of effort data by craft and gear categories, a further and more detailed breakdown of fishing effort in relation to fishing power and fishing costs is essential to both fishery biologists and economists. At the present time, however, the relative importance of all factors responsible for differences in fishing power and costs of input are not known and it is neither possible nor desirable to enumerate and publish the effort statistics for each fishing unit separately. There is, however, a definite need for a broad classification to permit the comparison of fishing effort and costs of input by different countries and at different times and in different areas.

11. The results of numerous studies have shown, however, that one factor with which fishing power is related is the gross tonnage of the fishing craft 2/, and at present both ICES and ICNAF use a breakdown by gross tonnage, although these agencies do not use the same tonnage categories. The Meeting agreed that this basic classification by tonnage classes should be retained and that ICES should classify fishing craft over 500 gross tons, by the same classes currently used by ICNAF. Although the tonnage categories used by ICES and ICNAF for craft below 500 gross tons are not uniform, this may not pose a major problem at present since there are relatively few vessels between 100 and 500 gross tons fishing in areas

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1/ See Section 3.2.4.

2/ See contributions in Section 3.2.2.

of common interest. However, the Meeting considered it necessary that this problem be studied further by the secretariats of the international organizations with the object of making proposals for a wholly uniform classification which could then be adopted by FAO.

12. In addition to this broad tonnage classification there is a need for a definition of effort in terms of other factors which seem likely to be related to fishing power and cost. The results of investigations in different regions have shown that, in the case of otter trawlers, fishing power is related to engine horse-power, and in some cases also the length of the fishing craft. The Meeting considered that for the present the most suitable scheme would be to retain gross tonnage for the basic classification, but that within each broad tonnage class it is desirable to specify the average gross tonnage, the average engine horse-power, and the average length, these averages being weighted according to the length of time each fishing unit was operated. The most suitable weighting factor for this purpose is the number of hours fished by each unit. However, it was recognized that in cases where countries do not have sufficient information to weight on this basis, numbers of days fished, or numbers of trips will provide useful weighting factors, provided always that the method of calculation is reported.

13. It was recognized that gross tonnage, horse-power, and length may not be the only important factors in measuring fishing power and fishing costs for otter trawlers or other craft. It was proposed that to obtain information on the importance of other factors, governing fishing power and fishing costs, an inventory of vessel characteristics comparable to that currently being compiled by ICNAF and listed in document WP/9 1/ should be compiled by each country and reported to the appropriate international organizations. Suitable summaries could then be published.

3.2.3.4 KINDS OF OPERATIONAL STATISTICS OF FISHING EFFORT

14. For fishery assessment purposes, the biologist usually requires data on the amount of fishing effort applied to particular fish stocks. For this purpose it is an absolute minimum requirement that all countries should collect and supply catch and effort data for each species, allocated by type of gear used, place fished, and the time of year when fishing took place. The details on gear, place, and time must be fine enough so that the data can be assigned to particular stocks. The collection of such catch statistics is now largely satisfactory for "offshore" fishing in the ICES area, but may not yet be pursued in sufficient detail in the ICNAF area. In several instances coverage of the "inshore" fisheries is seriously deficient on both sides of the Atlantic.

15. However, the position with regard to effort data is less satisfactory, and more precise information is required, before it is possible to calculate catch per unit effort, as a reliable index of stock abundance. General experience has shown that the number of operations of the fishing gear, multiplied by the length of time operated where appropriate, is a suitable index. Every attempt should therefore be made to collect such data for appropriate areas, and time intervals.

16. The Meeting agreed that in the case of otter trawling, the most realistic index is the number of hours fishing, and where possible this information should be reported in the national submissions to the international agencies. It was

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1/ See Section 2.6.2.

recognized, however, that some countries may find it easier to report their data in the form of the basic observational data, i.e. number of operations and average duration of each operation. The two forms of reporting are regarded as equally satisfactory.

17. Whichever method is used, all countries should employ the same definition of "hours fishing". It was agreed that this should mean "total number of hours during which the trawl is on the bottom". It was felt that at this stage no precise guidance could be given for the treatment of data for hauls in which the gear is fouled or torn. In general, however, it is desirable to define the time on bottom as the "hours during which the trawl is on the bottom and fishing". The Meeting also stressed that in those fisheries where information on "hours fishing" cannot be given, the closest possible approximation to it should be reported, with a precise indication of the methods employed in computing it.

18. It was noted that in addition to or instead of "hours fishing", many countries collect data on "fishing days", usually defined as "the number of days on which any fishing took place". The Meeting considered that this definition should be generally adopted, and regarded this statistic as of value to research workers in studying operational characteristics of fishing units.

19. In the case of fishing gear categories other than otter trawls, similar consideration should be given to the reporting of effort data. For example, in the case of long-line or other hook and line fishing, it is necessary to report the number of hooks and the hours fished. For Danish seining difficulties arise in the determination of the most appropriate unit of time for effort measurement. The Meeting considered that pending the formulation of a standard definition for it, the criteria used by countries in collecting effort statistics for Danish seine fisheries should be reported to the international agencies. In some other cases, such as beach seines, the number of operations of the unit is the important factor for measuring effort, rather than the duration of the haul.

20. In addition to the above information on fishing effort, used principally by fishery biologists, economists, administrators and businessmen often require additional information on inputs, either for the fishery as a whole, or separately for craft categories or other components of the fishery. The following items are of special relevance:-

(a) the number of fishermen,
(b) the number of vessels operating and
(c) the time absent from port, reported to the nearest whole day.

21. As shown in document SP/8 "The statistical needs of the designer of large trawlers and ship-borne processing plant" more detailed statistics on input operations are often required to meet specific, ad hoc or long term demands. The Meeting agreed, however, that for the most part these could not normally be provided in international statistical publications.

22. It was recognized that there are further factors of ever-increasing importance to the definition and measurement of total fishing effort. The Meeting regarded as one of the most perplexing and important problems the treatment of data on searching effort, either by ships or other devices not directly engaged in the capture of fish, or by the fishing vessel itself, using electronic devices, or in the case of pelagic fishing, depending on visual sightings of schools. In all such cases, there is an a priori decision as to whether or not a particular fish concentration shall be fished and how many fishing operations will be undertaken in a locality. The measurement of fishing time and of the area fished therefore requires adjustment before the effort data can be compared with those for less

"directed" fisheries. It was recognized that these factors are important to both biologists and economists but that little information on this problem is at present available. It was agreed that more research is required on the measurement of fishing effort in such fisheries.

3.2.3.5 STANDARDIZATION OF FISHING EFFORT STATISTICS

23. The Meeting recognized that there is a continued need for information which will lead to a more complete standardization of the classes and units of effort. It is expected that the information already in hand, or being collected, and the research programs in progress or recommended will help to provide a satisfactory basis for the reporting of standard effort over all classes of trawlers. However, further comparative fishing experiments or studies of differences in the size composition and amounts of fish taken are likely to be required before standardization can be extended to cover fisheries in which other gear or a number of different types of gear are used.

3.2.3.6 ASSIGNMENT OF EFFORT TO SPECIES FISHED

24. For fishery assessment purposes the biologist usually requires information on the relative abundance of particular species. Theoretically, this is measured by dividing the catch of the species by the standardized effort devoted to catching it. However, in fishing where the catches consist of more than one species the assignment of effort to each often causes difficulties. In cases where a skipper fails to find a particular species he may direct his attention to another species, a group of species in the same general fishing area. Failure to allow for this change through lack of information on the intentions of the fishermen, and the species sought after, may lead to biased estimates of fishing effort for each species, and hence of its stock abundance. This problem is especially important in certain of the complex mixed fisheries in the ICES area.

25. The Meeting agreed that for certain fisheries information on the intention of the fishermen to fish particular species is an important aid to biologists in the assignment of fishing effort, and in the estimation of stock abundance in cases where the intention of the skipper is of importance in influencing his catch but which cannot be ascertained from the statistics alone, attempts should be made to collect this information and report it. In those cases where effort can be assigned unambiguously to a particular species of a mixed catch it should be separately reported to and published by the international organizations.

3.2.3.7 MANPOWER STATISTICS

26. The Meeting noted that, at present, there is no agreed definition or classification of manpower in the fishing industry, and that national publications provide no clear or uniform categorization of personnel in their statistical publications. Such definitions and classifications are needed before comprehensive manpower statistics can be compiled and published by the international statistical offices, to meet the needs of economists and other users. The Meeting therefore drew up a set of definitions, and proposals, concerning the reporting of manpower statistics by national statistical offices. These are set out in full in Section 3.2.4.

3.2.3.8 PRICE STATISTICS OF INPUTS

27. The requirements of economists for input cost data, as illustrated in document WP/3 1/ and stressed by the Meeting in its consideration of requirements (see Part 2) was noted by the Meeting in its treatment of intput statistics. Conclusions and recommendations concerning the provision of these and other monetary statistics are set out in Section 4.

3.2.4 CONCLUSIONS AND RECOMMENDATIONS

28. The conclusions and recommendations of the Meeting on the items considered under inputs are given below.

29. The Meeting suggested to governments that the following two-way classification is a sufficient basis for supplying effort data for both inshore and offshore fisheries to ICES and ICNAF.

(a) Craft Categories:

(i) Steam:
- (a) coal
- (b) oil.

(ii) Motor:
- (a) gasoline
- (b) diesel and diesel electric.

(iii) Sail

(iv) Oars

(b) Gear Categories:

(i) Otter trawl
(ii) Pair trawl
(iii) Beam trawl
(iv) Danish seine
(v) Ring net (including purse seine)
(vi) Beach seine
(vii) Drift gill net
(viii) Bottom gill net
(ix) Fixed gear (including weirs, traps, pots, creels, etc.)
(x) Long-line
(xi) Hand-line
(xii) Other line
(xiii) Dory vessel
(xiv) Dredge (scallop, oyster, etc.)
(xv) Harpoons

1/ See Section 2.

The Meeting recognized that additions or revisions of this classification may be necessary as other types of craft and gear come into commoner use, or to make the list conform with standard international terminology, and it proposed that the international organizations should consult with Governments to ascertain progress in the implementation of this classification with a view to eventual international collection and publication of national statistics.

30. It recommended that ICES should classify fishing craft over 500 gross tons, by the same classes currently used by ICNAF. It further recommended that the classification of craft below 500 gross tons be studied further by the secretariats of the international organizations with the object of making proposals for a wholly uniform classification.

31. It noted that in addition to this broad tonnage classification there is a need for a definition of fishing effort in terms of other factors which seem likely to be related to fishing power and cost, and therefore also recommended that in the case of otter trawlers, statistics of engine horse-power and vessel length should be included in statistical publications. The most suitable scheme would be to retain as the basic classification gross tonnage, but that within the tonnage classes, it is desirable to specify the average gross tonnage, the average engine horse-power, and the average length, these averages being weighted according to the length of time each unit operates.

32. It proposed that, in order to obtain information on the importance of factors other than gross tonnage, horse-power and length, in relation to fishing power and fishing costs, an inventory of vessel characteristics, comparable to that currently being compiled by ICNAF, should be compiled by each country and supplied to the international organizations to which they report.

33. The Meeting recommended that every attempt should be made by governments to collect effort data, in terms of the number of operations, multiplied by the length of operation time, by appropriate areas and time intervals. It agreed that in the case of otter trawling, the most realistic index is the number of hours fishing, and that, where possible, this information should be reported. It was also agreed that this should mean "total number of hours during which the otter trawl was on the bottom and fishing." The Meeting further recommended that in the absence of information on "hours fishing" the closest possible approximation to this value should be reported with a precise indication of the methods employed in computing it.

34. It also recommended that where statistics of "days fished" are collected and reported in addition to, or instead of "hours fishing", they should be defined as the number of days on which any fishing took place. This statistic was regarded as of value to research workers in studying operational characteristics of fishing units.

35. It considered that in the case of fishing gear categories other than otter trawls, similar consideration should be given by governments to the reporting of the number of units of operation, and their average time set. For example, in the case of long-line or other hook and line fishing, it is necessary to report the number of hooks and the hours fished. In the case of Danish seining it is important to arrive at a standard definition of the length of time fishing. Until such a standard is agreed upon, this definition should be used by governments in collecting statistics to be reported to the international agencies.

36. The Meeting recommended to governments that research should be carried out on the measurement of effort for fisheries in which searching constitutes an integral part of the fishing operation.

37. It also recommended to governments that for fisheries where the intentions of the fishermen can ordinarily influence his catch, but which cannot be ascertained from the catch statistics, attempts should be made by governments to collect and report information on the fishermen's intentions. In those cases where effort can be assigned unambiguously to a particular species of a mixed catch it should be separately reported to and published by the international organizations.

38. It further recommended to governments that in reporting marpower statistics:-

(a) Reporting governments should, in general, follow the International Standard Classification of Occupation established by the ILO.

(b) All seagoing personnel on fishing craft should be called fishermen, and all craft predominantly engaged in the primary fishing industry should be classified as fishing craft.

(c) Fishermen should be reported under the following three classifications:

(i) Full time
(ii) Part time
(iii) Occasional

(d) In the interest of standardization and international comparisons, these classifications need to be defined as follows:

(i) Full time: A man who receives at least 90 per cent of his livelihood from fishing or who spends at least 90 per cent of his working time fishing.

(ii) Part time: A man who receives at least 30 per cent of his livelihood from fishing but less than 90 per cent.

(iii) Occasional: A man who receives under 30 per cent of his livelihood from fishing.

Note: Time spent on shore occupations directly connected with fishing operations should be considered as fishing time.

(e) Sport fishermen should be excluded from manpower statistics.

(f) The attention of the ILO should be drawn to the fact that part time fishermen may be engaged in a wide range of other occupations.

(g) In the national classification of workers by occupation, the fishing industry should receive no less treatment than that given to other industries.

3.3 OUTPUTS (CATCH AND LANDINGS STATISTICS)

3.3.1 GENERAL REMARKS

39. Statistics of catches and/or landings, in physical and monetary terms have been collected and published by national and international fishery agencies for many years, in some countries for centuries. In most countries, provisions are made at the landing ports for their routine collection, either from trading returns, or directly from censuses taken by collectors of statistics on the landing quay. A survey of the kinds of output statistics collected, the methods of collection, compilation and publication by North Atlantic countries was given in document WP/1, "Report on a survey of Fishery Statistics of main countries fishing the middle and North Atlantic Area", and its supplement WP/13.1 and WP/13.2 1/. The subject is also dealt with in the report of the 1952 Meeting on Fishery Statistics 2/.

40. For the most part therefore, the provision of these statistics in national and international statistical publications is currently more complete, especially of landings, and presents less formidable conceptual and practical problems than do the statistics of inputs.

41. However, as the contents of WP/1, WP/13.1 and WP/13.2 show, the systems of collection, compilation and publication of these statistics differ between countries, often substantially. This is because the national systems have grown largely indipendently of one another, mostly for meeting national needs. In consequence, differences in definitions, terminology and classification of statistical items, in the units of measurement, and in their treatment and presentation, have arisen between countries. These have led to difficulties, especially for the international statistical offices, in the compilation and publication of uniform, complete and comparable international series of output statistics for meeting the needs of especially the specialist users, such as fishery biologists and economists.

42. Therefore, as with statistics of inputs of the primary phase, the principal problems facing the Meeting fell into two categories; those concerning the definition, terminology and classification of statistical items, with special regard to international reporting of statistics, and those concerning the kinds of statistics needed to meet the special needs of different groups of users. Problems in the first category are, currently, of major importance to the statistical offices of the three sponsoring international organizations, and these were dealt with in detail by the meeting, not only with respect to output statistics of the primary phase, but also to those of the secondary and tertiary phases, and consumption statistics. The treatment of the problems for these latter phases is reporded in Part 4.

1/ The summary of WP/1 is included as Annex E.

2/ "Purposes and Methods in Fishery Statistics".

3.3.2 PROCEEDINGS

3.3.2.1 GENERAL REMARKS

43. The subject matter under outputs of the Primary Phase was dealt with under the following headings:-

(a) Definitions of and terminology for items of output statistics.

(b) Classification of statistical items.

(c) Conversion factors.

(d) Statistics of discards.

(e) Statistics of direct foreign landings.

(f) Statistics of fishery activities outside normal commercial channels (sport and subsistence fishing).

(g) Value statistics.

3.3.2.2 DEFINITIONS OF AND TERMINOLOGY FOR ITEMS OF OUTPUT STATISTICS

3.3.2.2.1 General Remarks

44. Although no documents dealt specifically with this topic, the problem of definitions and terminology for output statistics, was examined by the Meeting with special regard to the need for comparability and standardization of statistical reporting by countries to the international statistical offices.

45. It was recognized that as a result of differences in the treatment of the fish caught at sea, between fishermen of different countries, between fisheries using different fishing methods and between seasons and fishing grounds, various measures of outputs of the fishing industry are possible, and are of greater or lesser importance and relevance to the requirements of the different groups of users. For example, the quantity of fresh fish, or other aquatic organisms, taken from the sea (the "catch") is the measure of direct interest to fishery biologists. This may be subjected to various forms of "treatment" before it is brought ashore as "landings" of whole fish, processed or semi-processed fish products, statistics of which are required by economists, administrators and businessmen. Statistics of "landings" are the ones normally collected at the fishing ports, and these are either reported as such, or converted, using appropriate conversion factors, into catch equivalents. Hitherto, different definitions and terms have been adopted by national and international agencies for these different measures. The Meeting therefore examined the definitions and terms currently in use, and drew up a list of standard definitions and terms for use by countries in reporting statistics in national publications, and for reporting to the international agencies. The recommendations of the Meeting on those definitions are given below in Section 3.3.2.2.2.

3.3.2.2.2 Recommendations

46. In view of the need for uniformity of definition and standardization of terminology, especially in international reporting, the Meeting made the following recommendations:-

I .....that Governments and international bodies should adopt in their statistical publications the following definitions and terms:

(a) Gross catch: The weight of the fish taken from the sea.

(b) Discarded catch: That part of the gross catch which, as whole fish, is returned to the sea at the time of capture.

(c) Retained catch: That part of the gross catch which, as whole fish, is not discarded.

(d) Landings: The weight of fish and fish products brought ashore.

(e) Nominal catch: The live-weight equivalent of the landings.

Note: The difference between retained catch and landings is accounted for by:

(i) Consumption by crew;
(ii) Use for bait;
(iii) Dumping of guts, heads and other parts of retained fish;
(iv) Dumping of fish (whole or processed) because of spoilage or other reasons;
(v) Loss or gain of fluid content.

Synonyms:

Gross catch - Real catch

Nominal catch - Landings, round fresh.

II .....that the term "landings" should not be used synonymously with number of "arrivals" or "trips".

III .....that where English is used in national publications the above terms should be adopted; for their French and Spanish equivalents see this Report in these languages; where countries use other languages they should notify the international organizations of equivalent terms in these languages.

3.3.2.3 CLASSIFICATION OF STATISTICAL ITEMS

3.3.2.3.1 General Remarks

47. The process of developing and refining national and international statistical systems requires the formulation and adoption not only of standard definitions and terminology, but also of standard classifications and methods. As well as the basis for international statistical systems, they serve:-

(a) to guide national offices in the elaboration of more detailed standards, required by the national systems; and

(b) to encourage comparability between the systems of different countries.

48. The classification currently used by FAO for the arrangement of the various "species items" appearing in national and regional statistics of catches and landings was described in document SP/5 1/. At present, each of these species items in the national statistics has to be identified in terms of the FAO groups and sub-groups before the data can be incorporated under the various headings in the tables of the Yearbook of Fishery Statistics.

49. Lists of common and scientific names of the species, of commercial importance in the various countries, although of great use in the identification of the various statistical items, do not necessarily solve the problems of identifying, in terms of the species, the individual items appearing in the landings and catch tabulations prepared by national offices. The following examples indicate the nature of the difficulties encountered in trying to identify statistical items by means of a general list of common and scientific names:

> A list of species names may cover, say, 100 species and the statistical "species items" in the tabulations may number 59 with a sixtieth called "other". It is by no means clear whether the remaining 41 species are all included in this 60th category. It is possible that at least some of the statistically unidentified species might be grouped with a closely related species for which there is a specific statistical provision; a list of names may, for example, give ten different species of teleostean flat-fishes, whilst in statistical tabulations, there may be only one item called, say, "soles", or "flounders", or "flat-fishes". In these circumstances, it is by no means clear whether all the ten species are covered by this particular item, and if not, which of the ten would necessarily be included.

50. The only solution of these difficulties is for each country to prepare a key to common and scientific names, of all the statistical items which are used in tabulations. It would also be necessary in this key, to identify clearly the various species that might be lumped together and included in the general category called "other" at the end of the list of statistical items.

51. Another difficulty, experienced in adapting national details to international requirements is the item "other" which could be given headings such as "unsorted and unidentified fishes", "industrial fish", "species not identified", "species not elsewhere specified". It appears to be inevitable for such an item to appear in statistical tabulations and it becomes a serious problem if the quantities under it in the national statistics reach significant proportions. Large quantities under this heading prohibit the compilation of accurate species or group totals for an area.

52. When it is not possible to obtain separate, complete statistics for every species, sampling might have to be used in order to determine the approximate species composition of the miscellaneous quantities included under the heading "unsorted and unidentified fishes". The Meeting considered that an attempt should be made to determine the composition of these quantities, at least in terms of the FAO species groups. This would permit the breakdown of the unidentified quantities according to species groups, and for each of these there should be established a statistical item "other".

1/ This classification, FAO International Standard Statistical Classification of Aquatic Animals and Plants, approved by the Meeting and subsequently revised by the FAO/ICES/ICNAF Continuing Working Party on Fishery Statistics in the North Atlantic Area, is given in Annex F.

53. In the tabulations of "landings" of some countries, there appear items such as "livers", "heads", "roes" and similar parts of fish. These items offer no difficulties in the case of "catch" statistics, for the quantities can be covered by the live-weight of the species items, but in the case of "landings" some difficulties of classification arise. If these are derived mainly from a particular species, the quantities of heads, livers and roes should be arranged under the same species group, (with a footnote to the effect that small quantities derived from other species might be included). If, on the other hand, the quantities of these parts of fish are derived from species belonging to separate groups, it may be possible by sampling to allocate them to the relevant groups.

54. In some statistical tabulations there appear an item, "offal", which could consist of (a) viscera, fins, etc., obtained from dressed fish itemized elsewhere in the tabulations; and/or (b) whole trash fish. It is not always easy to determine the composition of this item "offal" in terms of these two components, but here again, sampling methods might be used to provide estimates of each.

3.3.2.3.2 Conclusions and Recommendations

55. The Meeting recognized the need for a standard classification of statistical items of catches and landings for use by governments in submitting statistical data to FAO, ICES and ICNAF, and it therefore recommended that the order of species groups, used by FAO 1/, should be adopted for reporting data to the international organizations and that ICES and ICNAF, whilst not each requiring the same amount of detail, or necessarily the same species order, should accept the order and merely extract from the tables furnished, the information required by them. 2/

56. Whilst it was generally agreed that it would not be possible to eliminate altogether the item "other", the Meeting considered that attempts should be made by all national statistical offices to reduce the quantities involved to not more than 10,000 tons or 10 per cent of its total, whichever is the lower. 3/

3.3.2.4 CONVERSION FACTORS

3.3.2.4.1 General Remarks

57. Due to the differences in the "treatment" of the catches taken by the fisheries of different countries and fishing communities and practices within a country and to the use by countries of different units of measurement, problems arise in providing comparable international compilations of output statistics from the national submissions. These problems were dealt with in document SP/6, excerpts from which are presented in Section 3.3.2.4.2 (A) below.

1/ See Annex F.

2/ The importance of standardization of classification of statistical items is discussed further for statistics of fishery commodities in Part 4 of this report, and again in Part 5 with regard to the simplification of reporting of statistical data by countries to the international statistical offices.

3/ See Section 5.2 for recommendation on this item.

3.3.2.4.2 Contributions

58. A. "FISHERY STATISTICS: CONVERSION FACTORS" (L.P.D. Gertenbach) 1/

Introduction

The various factors used in calculation and computation of work related to fishery statistics could be conveniently classified as follows:

(a) Factors indicating the relationship between measure units and different weights and measures systems.

(b) Factors used to convert quantities expressed in terms of capacity or volume units to their equivalent in terms of weight units.

(c) Factors used for converting quantities of fish recorded at a particular stage, normally landing, to the original live weight of the fish, in the round, at the moment of capture.

(d) Factors used to derive the equivalents for one of several earlier or succeeding stages of processing or preservation.

(e) Factors used for converting values of quantities expressed in terms of the monetary units of one particular currency system to their equivalent in terms of the units of another currency system.

General Weight and Measure Units

In the countries fishing the North Atlantic, there are only two general systems of weights and measures in use, (i) the metric system, and (ii) that which is conveniently called the "British system". Internationally, the former is adopted for preparing and publishing statistics on an international basis.

In Canada, Ireland, the U.K, and the U.S., the British system is used, although some of the units of this system, in particular the capacity units, (gallons, quarts and pints) are different in the U.S., from Canada, Ireland and the U.K., although the same names are given to them. There are also minor differences in the linear units and in the weight units, because of differences in local definitions in terms of their metric equivalents. To ensure the consistent use of the same conversion factor when converting from British units to metric units, it might be advisable to adopt the compromise factors proposed in Sections I and II of "World Weights and Measures". 2/ Attention is drawn to the following note which appears on page 5 of this publication, and reads as follows:

> ".... The equivalents shown, plus or minus 0.5 of the final digit, comprise both British and U.S. equivalents and are believed to be sufficiently accurate for the purposes of economic statistics. For more precise conversion factors, the reader is referred to the work of Committee No. 12 of the International Organization for Standardization, Copenhagen, and more especially document ISO/TA 12 (Secretariat-48) 125 E, Proposed Draft ISO Recommendation "Fundamental Quantities and Units of the MKSA-System and Quantities and Units of Space and Time"."

1/ FAO, Rome, Italy.

2/ World Weights and Measures, Handbook for Statisticians, Provisional Edition, Prepared by the Statistical Office of the United Nations in Collaboration with the Food and Agriculture Organization of the United Nations, New York, 1955.

Whilst many of the abbreviations for weight and measure units in national publications cause no difficulties when used by local readers, foreign readers may sometimes be confused by abbreviations which appear ambiguous, or which are not sufficiently precise. A great step forward would be a careful scrutiny of all national and international publications, to ensure that in all instances, in the selection of abbreviations and names, there is a clear indication of the precise unit of measure. It would, for example, be a great help if any publications using units such as tons, quintals, cwts., specified clearly what they mean, e.g. it might be advisable to have tons called "long tons", "short tons" and "metric tons", to remove any doubt whatsoever. The use of the abbreviation cwt. might be improved by putting in brackets in all instances "112 lb." or "100 lb.". There are also, for example, instances where in, say, Norwegain, the word "tonne" means "barrel", and the unwary foreign reader might mistake this for "ton", which is spelt "tonn" in Norwegian. It would also, therefore, be a help if a multi-lingual key to any of the units, could be introduced in publications.

Conversion of Capacity Units to Weight Units

In several fisheries, and therefore also in statistics related to them, capacity units are used. It is necessary to convert these quantities, in volume or capacity units, to their equivalent in terms of weight units. The factors will vary from commodity to commodity, and according to how tightly the contents are packed, the size of the fish, ice and other ingredients etc. The capacity units which are used belong generally to two types, (a) general capacity units, such as gallons, hectolitres, etc., and (b) special units used mostly or exclusively in the fishery industry, i.e. crans, kantjes, barrels, bags, boxes, cases, etc.

Wherever such units are used in statistical publications, it would be very useful if a key were provided, indicating the factor to be used when converting the quantities expressed in such units, to their equivalent in terms of the standard weight units of either the British or the metric systems.

It should also be noted that these units are not only encountered in the case of catches and landings, but also in publications showing statistics concerning the production of semi or completely processed fishery products.

Landed Weight/Liveweight Relationships

It is necessary that countries should distinguish carefully in the headings of their tables, between catch and landings. Usually, the word "catch" is used when the quantities in the table itself refer to "landings" on a landed weight basis. Some editing of the national publications, and even international ones, and collaboration between the national and international offices could, over a short period of time, eliminate any confusing use of these two terms. Here too, it might be necessary to issue a multi-lingual key, indicating the equivalent of the terms "landings" and "catch", in the different languages on both sides of the Atlantic.

Since a first recording of the quantities produced by the fishermen usually occurs at the point of landing, the landing statistics thus obtained are the basis for the computation of derived figures such as the nominal catch. It is therefore necessary in the case of those species which, at the time of landing, have been eviscerated, gutted, dressed or processed in any way, which would result in a change of the weight when compared with the species original live weight, to have live weight/landed weight conversion factors. These

will differ from species to species, and from fishery to fishery, all within the same country, and due to different practices, there may be significant differences in the factors for the same species in the statistical systems of different countries.

Whilst this problem is generally recognized, it is probably appropriate now to determine ways and means of making generally known, the available information. A solution that is offered here is that a questionnaire should be prepared by FAO, individually for each country, listing all the statistical items appearing in the national publications, with a request that against each item is indicated a brief description of how that species is eventually landed, e.g. in the round, headed, gutted, eviscerated, filleted, etc. Then, against each item should also be indicated the approoriate conversion factor, expressing the particular landed weight as a percentage of the liveweight, the percentage to be expressed to one decimal. On the other hand, it may be more useful to express this factor as a multiplier.

Yield and Extraction Rates

The relationship between liveweight and landed weight is also a yield rate, but because of their particular significance in fisheries, they have been dealt with separately in preceding paragraphs. Here, in this section, references are made to yield and extraction rates used to indicate the relationship between raw materials, semi-processed materials, semi-processed commodities and completely processed commodities, at the various stages of input and output. Such factors are essential in the determination of the edible weight of the different fishery products, and are required for the calculation of the data in food balance sheets.

It is proposed that FAO prepares for each country a special questionnaire, listing all the fishery commodity statistical items appearing in the production of international trade statistics of the country, with a request to indicate the particular commodity's weight, as a percentage of (a) the original live weight, and (b) the edible weight. Naturally these factors would be very approximate, as in many cases the statistical items cover a large number of heterogeneous commodities, but it should at least be useful to obtain satisfactory factors for those products which are of importance to production and trade.

3.3.2.4.3 Conclusions and Recommendations

59. The Meeting examined the units of measurement, and conversion factors currently used by countries, and the international statistical offices in the light of the need for standardization and comparability in the reported statistics of the primary phase, in national and international publications. It stressed the increasing importance and complexity of this subject, in view of the growth of processing operations at sea, especially on board factory vessels.

60. The Meeting stressed the need for a clear and precise indication of the various weight and measure units used in the tabulations appearing in national and international publications.

61. The Meeting recommended to governments that as far as possible the various publications should be carefully edited to ensure the use of precise terminology and abbreviations. It invited FAO to prepare and publish a volume in which would be listed the standard terms and abbreviations used for the different weights and measures encountered in the tabulations published nationally. Reference to this volume could then be made in the national publications.

62. The Meeting further recommended to governments that the weight equivalent of general capacity units and special fishery capacity units should, as far as possible, be presented in national publications where such capacity units are used. All national and international offices would profit from the consequent decrease in ambiguity.

63. The Meeting invited FAO to call the attention of individual governments to any specific instances at present giving rise to confusion.

64. The Meeting drew particular attention to the relation between landed weight (often the first stage at which weight or volume measurements are regularly obtainable) and retained catch, as live weight (the form required for international statistics). This relationship is of great significance in those fisheries where the catch is not only dressed but also processed before landing by means of salting, filleting, canning or reduction to meal and oil. The weight landed is also reduced by losses in transport such as losses of body fluids as well as decreases due to causes such as dehydrating, pulping and other factors which might be partly offset by measures taken to preserve the fish.

65. The Meeting noted that although in some cases conversion factors may vary between nations because of methods of fishing or transportation, nevertheless these factors should be made available internationally. The Meeting therefore recommended that FAO should seek from the governments concerned, information on the factors used to obtain equivalent live weight. The data should be given for each species and for each condition (gutted, filleted, etc.) in which the catch is landed. Particular attention should be given to those species for which no conversion factor is at present used, and to improving the accuracy of factors for salt fish and filleted fish, where the factor is very large. Accurate information on these factors will only be obtained by special observations on vessels at sea, at all seasons and on all fishery grounds under normal commercial conditions, and it was suggested that these observations could be combined with those on discards. The factors should be kept under observation to check on possible changes with changes in commercial practice.

66. The Meeting recognized the importance at both the national and the international level of adequate extraction and yield rates and recommended that, as far as possible, the national offices should furnish FAO with detailed conversion factors, to be used for converting various semi-processed and finally processed fishery commodities into their equivalent in terms of landed weight and live weight. It appears that these are already available in the records of many national offices concerned with fishery administration and that an exchange of information of this type would be of benefit to all concerned.

67. The Meeting proposed that FAO should assemble the available information by issuing questionnaires to countries.

68. The Meeting noted that there are many considerations involved in the derivation of factors of this type which make it necessary to recognize that at the present stage these conversion factors should be interpreted as indicating merely the order of magnitude involved.

69. Bearing in mind the existing deficiencies in the available statistics the Meeting was of the opinion that, from the point of view of the industry and of the businessman, variations in weight during transport and storage ashore are not sufficiently large to justify the making of specific proposals.

70. The Meeting, however, recognized that in certain circumstances a slight variation in weight might lead to substantial variations in financial returns to individual traders.

3.3.2.5 STATISTICS OF DISCARDS

3.3.2.5.1 General Remarks

71. As shown in Section 3.3.4.1 the quantity of fish or fish products landed often differs from the quantity caught, due to the various forms of treatment to which the gross catch is subjected, at sea. Therefore, the published statistics of landings, in national and international publications often fall short of the requirements of the specialist users, particularly fishery biologists, whose interests are centred principally on the total quantities of fish killed by the fishery.

72. Amongst the treatments, giving rise to the difference between the gross catch and landings, one of the most important, and most neglected in national statistical collection and publication systems is the discarding or loss at sea of whole fish caught by the gear. This may arise from a number of causes, and so may vary markedly between countries, gears, places and times. Unlike other treatments which give rise to a loss of weight between capture and landing (e.g. gutting and other processing), this loss factor cannot be handled readily by the use of appropriate conversion factors, as specified in Section 3.3.4.

73. The detailed requirements for statistics of this category of losses, and the methods of providing them were examined by the Meeting. It recognised that the retained catch could fall short of the quantity killed by the operation of the gear in any of three ways:-

(a) Some fish may come in contact with or pass through the gear, only to escape and subsequently die.

(b) Some fish fall or become detached from the gear as it is hauled on board and if they are dead or subsequently die are thereby removed from the stock.

(c) Some fish are brought on board, and subsequently thrown overboard in a dead or dying state.

74. Under (a) and (b) it is necessary to distinguish between fish that die and those that do not. Any fish that survive after being returned to the sea are not lost from the stock, and cannot be regarded as "discards" as defined here.

75. The Meeting also recognised that complete statistics on these "sources of loss" are not generally available, but need to be estimated from experimental and sampling data. Practically nothing is known about the loss of fish from encounter with the gear. It was recognised that special experiments would be necessary to estimate this loss and that therefore there was little likelihood of regular statistics being obtained. However, the loss of fish just before, or after, coming on board can be measured or estimated in two ways:-

(a) Directly: the person best qualified to do this is generally the skipper or mate and he can either record his estimates in a log book provided for the purpose, or report them to an observer sent to sea for that purpose. It was felt that the presence of observers on board ship was most desirable. For one thing a skipper may not always choose to record what he sees, and the presence of an observer should considerably reduce the possibility of bias arising for this reason. Secondly an observer is in a position to collect necessary information on the size composition of the "discards".

(b) Indirectly: in special circumstances, research vessel catches obtained when fishing near the commercial fleet may be used to estimate the quantity and size composition of the "discards".

3.3.2.5.2 Conclusions and Recommendations

76. The Meeting stressed the importance of these statistics, especially for meeting the needs of fishery biologists, and adopted the following recommendations:-

77. It agreed that information on fish discarded at sea is necessary to bridge the gap between the retained catch and the total killed. The expression "fish discarded", in normal usage, refers only to the difference between the retained catch and the gross catch. However, it was considered that as the biologist is primarily interested in the total killed, rather than the gross catch, it is necessary to consider all ways in which the retained catch might fall short of the total killed.

78. The Meeting recognised that while complete statistics on these "sources of loss" are not generally available, they should be estimated from experimental and sampling data. The Meeting recognised that special experiments will often be necessary to estimate this loss, and that therefore there is little likelihood of regular statistics being obtained.

79. The Meeting recommended to governments that countries should send observers to sea on representative sizes and kinds of vessel, and to all fishing grounds. They should collect information on the numbers, quantities and size composition of fish lost and discarded, for each species separately. As far as possible, an attempt should also be made to determine what proportion of these are dead or dying.

80. It was recognised that while no one procedure can be outlined for collecting information on fish discarded due to differences in the methods of treating the catch in different fisheries and on different craft, governments should compile reports describing their methods used for estimating and measuring discards.

3.3.2.6 STATISTICS OF DIRECT FOREIGN LANDINGS 1/

3.3.2.6.1 General Remarks

81. In a recent survey, conducted by FAO, of the procedures adopted by countries participating in the Meeting, in transmitting information on foreign landings to the international organizations, inconsistencies were disclosed, which in total, probably result in fairly substantial errors in the reported statistics both of the Primary Phase, and of imports and exports of fishery products. The treatment of these statistics by different countries was summarised in document SP/7, "Statistical Treatment of Direct Foreign Landings", excerpts from which are given in Section 3.3.2.6.2 (A) below 2/.

1/ This subject is also dealt with under international trade statistics in Part 4.

2/ Further excerpts from this contribution are included in Section 4.4.2.

3.3.2.6.2 Contributions

82. A. "STATISTICAL TREATMENT OF DIRECT FOREIGN LANDINGS" (L.P.D. Gertenbach) 1/

Introduction

At a very early stage in FAO's collection of fishery statistics on an internationally comparable basis, the inconsistencies in the statistical treatment of direct foreign landings became apparent. It should be stressed that these inconsistencies did not only appear when comparing the different practices between countries, but also when comparing the different practices adopted by the various statistical offices within the same country.

While the nature of the problem and the statistical difficulties have been examined in earlier international meetings and is covered in various publications, in 1959 FAO submitted questionnaires to the countries participating in this meeting, requesting information on the statistical treatment of direct foreign landings in their national statistics on fish production, imports and exports. The information received is summarized below. Here it must be stressed that the information given in "fish production statistics" refers to the data supplied to FAO by the country for inclusion in the FAO Yearbook. In some cases, the practice, as indicated, is not necessarily identical with the practice followed in the national publications of the country concerned.

The survey of the replies received from the countries indicates that it is a fairly simple matter for most statistical offices to eliminate or indicate separately in the production statistics those quantities landed locally by foreign fishing craft. It would also not be difficult to include such direct foreign landings in the import statistics.

However, it is obvious that several countries are of the opinion that they are having and will have great difficulties in attempting to trace the quantities delivered by their fishing fleet in foreign ports. In the absence of reliable data, such deliveries cannot be included in either the statistics of domestic fish production or of national exports.

These difficulties appear to be surmountable wherever this trade movement assumes comparatively large proportions; difficulties arise only in cases where deliveries by the national fishing fleet in foreign ports are made occasionally or incidentally.

Country Statements

Belgium

A. Fish Production Statistics

Data include quantities landed by Belgian fishing craft in foreign ports; exclude quantities landed by foreign fishing craft in Belgian ports.

Landings by foreign fishing craft in Belgian ports are negligible; landings by Belgian craft in foreign ports are relatively important.

B. Import Statistics

Belgian import statistics exclude the quantities landed directly by foreign fishing craft in Belgian ports.

1/ FAO , Rome, Italy.

C. Export Statistics

Belgian export statistics exclude landings by Belgian fishing craft in foreign ports.

Canada

A. Fish Production Statistics

Data include quantities landed by Canadian fishing craft in foreign ports; exclude quantities landed by foreign fishing craft in Canadian ports. This statement has been subject to one exception in the past. Landings of halibut in U.S. ports by Canadian fishing craft have not been included, through inadvertence in Canadian national statistics as published by the Dominion Bureau of Statistics. It has been agreed, however, that these figures will be included from now on, starting with the 1957 edition of "Fisheries Statistics of Canada". In the tables for Volume IX of the Yearbook of Fisheries Statistics, the halibut figures will include all landings made by Canadian fishing craft.

B. Import Statistics

Imports include quantities landed directly by foreign fishing craft in Canadian ports.

C. Export Statistics

Exports include quantities landed directly by Canadian fishing craft in foreign ports.

D. General Comments

Canada has no comments to offer on the recommendations and resolutions of the United Nations Statistical Commission except to say that they are in general agreement and that they conform to statistical practice in the field of fisheries in Canada.

Denmark

A. Fish Production Statistics

Data include quantities landed by Danish fishing craft in foreign ports; exclude quantities landed by foreign fishing craft in Danish ports.

B. Import Statistics

Imports include quantities landed directly by foreign fishing craft in Danish ports.

C. Export Statistics

Exports include quantities landed directly by Danish fishing craft in foreign ports.

Faeroe Islands

A. Fish Production Statistics

Data include quantities landed by Faeroese fishing craft in foreign ports; exclude quantities landed by foreign fishing craft in Faeroese ports.

B. Import Statistics

Included with Denmark beginning 1954. (see above)

C. Export Statistics

Included with Denmark beginning 1954. (see above)

Finland

A. Fish Production Statistics

Data refer exclusively to landings of Finnish fishing craft in Finland. Finnish fishing craft do not land catches in foreign ports; no foreign fishing craft land their catches in Finnish ports.

Germany, Federal Republic of

A. Fish Production Statistics

Data exclude both (i) quantities landed by West German fishing craft in foreign ports, and (ii) quantities landed by foreign fishing craft in ports of the Federal Republic of Germany.

B. Import Statistics

Imports include quantities landed directly by foreign fishing craft in West German ports.

C. Export Statistics

Exports exclude quantities landed directly by West German fishing craft in foreign ports.

D. General Comments

Fish landed by foreign fishing craft in German ports is included as imports in German foreign trade statistics, but fish landed by German fishing craft in foreign ports is not included as exports. Foreign trade statistics record "movement of goods crossing the frontier"(law on foreign trade statistics of 1 May, 1957). Therefore only these goods are recorded which in fact cross the German frontier; recording in done by the customs authorities at the moment the goods cross the frontier. Since fish landed by German craft in foreign ports does not cross the German customs frontier it cannot be included in the foreign trade statistics.

....As to information on the shipping trade, the quantities landed in foreign ports are regularly recorded under the "ordinance on fishery statistics". Furthermore, the ship-owners are obliged to continue reporting on the fishing craft, the draught results (quantity and value) and the sorts of fish according to paragraph 5 of the "Law on Fishery Statistics" the draft of which is at present under consideration. The quantities landed by German ships in foreign ports are regularly published by the German Federal Statistical Office so that there is the possibility of adding those quantities to the German fish exports.

Iceland

A. Fish Production Statistics

Data include quantities landed by Icelandic fishing craft in foreign ports; exclude quantities landed by foreign craft in Icelandic ports. Landings by foreign craft in Icelandic ports are negligible.

B. Import Statistics

Imports exclude quantities landed directly by foreign fishing craft in Icelandic ports.

C. Export Statistics

Exports include quantities landed directly by Icelandic fishing craft in foreign ports.

Ireland

A. Fish Production Statistics

Data exclude quantities landed by Irish fishing craft in foreign ports; include quantities landed by foreign fishing craft in Irish ports.

B. Import Statistics

Imports include quantities landed directly by foreign fishing craft in Irish ports.

C. Export Statistics

Exports exclude quantities landed directly by Irish fishing vessels in foreign ports.

Italy

A. Fish Production Statistics

Data exclude both (i) quantities landed by Italian fishing craft in foreign ports, and (ii) quantities landed by foreign fishing craft in Italian ports.

B. Import Statistics

Import statistics include quantities landed directly by foreign fishing craft in Italian ports. Italian import statistics also include the quantities landed in Italian ports by Italian fishing craft participating in the "pesca oceanica", i.e. Italian fisheries in the Atlantic.

C. Export Statistics

Export statistics exclude quantities landed directly by Italian fishing craft in foreign ports. It appears to be difficult for the Italian statistical authorities to obtain precise information about these quantities.

Netherlands

A. Fish Production Statistics

Data exclude quantities landed by Dutch fishing craft in foreign ports; include quantities landed by foreign fishing craft in Dutch ports.

B. Import Statistics

Imports exclude quantities landed directly by foreign fishing craft in Dutch ports.

C. Export Statistics

Exports exclude quantities landed directly by Dutch fishing craft in foreign ports.

D. General Comments

Fish landed in the Netherlands by foreign fishing vessels is sold at the primary auctions and is included in the Dutch landings' statistics, which means that this fish is not included in Dutch foreign trade statistics.

Fish which is landed in foreign ports by Dutch fishing craft is not considered as an export by the Netherlands.

The Central Bureau of Statistics has at its disposal figures regarding the landings of foreign vessels in the Netherlands as well as those regarding landings by Dutch craft in foreign countries; therefore, the data concerning the foreign trade of the Netherlands can be increased by these figures.

The Netherlands state that it would be advisable to mention these figures separately in publications on export and import statistics.

Landings of foreign vessels in the Netherlands and landings of Dutch vessels in foreign countries are only of minor importance for the Netherlands.

Norway

A. Fish Production Statistics

Data include, as far as possible, quantities landed by Norwegian fishing craft in foreign ports; exclude quantities landed by foreign fishing craft in Norwegian ports.

B. Import Statistics

Imports include quantities landed directly by foreign fishing craft in Norwegian ports.

C. Exports Statistics

Exports include quantities landed directly by Norwegian fishing craft in foreign ports.

Norwegian direct landings abroad were included in the Norwegian export statistics from 1 January, 1957. Export figures for earlier years are exclusive of direct landings in foreign countries.

Portugal

A. Fish Production Statistics

Data exclude both (i) quantities landed by Portuguese fishing craft in foreign ports, and (ii) quantities landed by foreign fishing craft in Portuguese ports.

B. Import Statistics

Imports include quantities landed directly by foreign fishing craft in Portuguese ports.

C. Export Statistics

Exports exclude quantities landed directly by Portuguese fishing craft in foreign ports.

D. General Comments

Portugal applies the United Nations recommendations to import statistics but it is not possible to apply them to the export data because of the impossibility of controlling the quantities landed by Portuguese fishing craft in foreign ports.

Spain

Spanish fishing craft do not land fish in foreign ports and foreign fishing craft do not land fish in Spanish ports.

Sweden

A. Fish Production Statistics

Data include quantities landed by Swedish fishing craft in foreign ports; exclude quantities landed by foreign fishing craft in Swedish ports.

B. Import Statistics

Imports include quantities landed directly by foreign fishing craft in Swedish ports.

C. Export Statistics

Export exclude quantities landed directly by Swedish fishing craft in foreign ports, but it is planned, that in the future these quantities should be recorded in the export statistics.

United Kingdom

A. Fish Production Statistics

Data exclude both (i) quantities landed by British fishing craft in foreign ports, and (ii) quantities landed by foreign fishing craft in British ports.

B. Import Statistics

Imports include quantities landed directly by foreign fishing craft in British ports.

C. Export Statistics

Exports exclude quantities landed directly by British fishing craft in foreign ports. The quantities of fish landed in foreign ports by fishing craft of the United Kingdom are negligible.

United States

A. Fish Production Statistics

Data include United States landings in foreign ports for trans-shipment to the United States when the quantities so landed are known; they exclude quantities landed by foreign fishing craft in United States ports.

B. Import Statistics

Imports include quantities landed directly by foreign fishing craft in United States ports.

C. Export Statistics

Exports exclude quantities landed directly by United States fishing craft in foreign ports.

D. General Comments

The United States complies with the United Nations recommendation that landings by foreign fishing craft at United States ports be included in import statistics.

Landings by United States fishing craft in foreign countries have not been included in United States export statistics. It would be difficult to comply with the United Nations recommendations that they be so included. Until recently, the only important landings by United States fishing craft in foreign countries were those at Prince Rupert, British Columbia, where fish were landed in bond for shipment to the United States. Data are available on these landings and the fish have been included in United States catch statistics. In recent years there has been a trend toward the landings of tuna by United States craft at ports in Central and South America for shipment to the United States. When it is known that shipments from these countries have consisted of fish taken by United States fishermen they have been included in United States catch statistics. However, this cannot always be determined, in which case the fish would be considered an import.

A further complication arises in determining whether certain fish should properly be considered as United States catch. There are a number of American flag vessels operating in South American ports which have not returned to the United States for many years and probably never will. The vessels are captained by a United States citizen and the engineer is probably a citizen. However, the remainder of the crew is of the nationality of the country in which the vessel is operated. When the catch is landed it may be combined with fish taken by vessels bearing flags of foreign countries and shipped to the United States. It would be difficult to decide whether the fish should be considered as taken by United States fishermen and even more difficult to determine the volume of the catch.

In recent months it has become evident that there will be an expansion of the shrimp fishery from the Gulf of Mexico along the South American coast. It is probable that in the future a considerable volume of shrimp taken by United States craft may be landed in South American countries for shipment to the United States. This expansion is constantly magnifying the problem of collecting statistics for economic use and for biological programs on which conservation measures may be based.

At this time, it is not known whether it will be possible to collect accurate data on the landings by United States craft in South American countries. Since there is no duty on imports of fresh or frozen shrimp, it may be difficult to obtain data on the volume of shrimp landed in foreign countries, even though the entire catch may be shipped to the United States.

3.3.2.6.3 Conclusions and Recommendations

83. The Meeting noted from this survey that catches and landings, reported by individual countries may refer not only to landings in the reporting country, from catches made by that country's own craft, but also: (a) to landings in foreign ports from catches made by the reporting country's own craft, and (b) to landings in the reporting country from catches made by foreign craft. The lack of consistency between countries in reporting these data may sometimes lead to substantial errors in the compilation of total fish production statistics for an area, and the total volume of imports and exports of fish and fish products.

84. It endorsed the international recommendations that landings in foreign ports from catches by the reporting government's fishing craft should be included in landings as well as in the export statistics of the reporting government, while landings in the reporting country from catches made by foreign craft should be treated as imports only. That is, such landings are reported as imports by the government of the country in which landed and as exports by the country of the fishing vessel.

85. The Meeting agreed that the products of factory-ships delivered directly to foreign countries should be treated statistically as production of the country to which the unit belongs. The government of the country to which the factory-ship belongs should treat such foreign landings as exports and the receiving country should treat the receipts as imports.

86. The Meeting further agreed that these are desirable standards to achieve, but recognized that many governments are facing difficulties in conforming to them particularly in obtaining data of direct landings in foreign ports sufficiently detailed to incorporate them with domestic production statistics. The Meeting therefore recommended that the government of the country in which the "foreign" landings are made should communicate to the government of the country to which the vessel belongs, particulars on species, quantities and values of the landings in question.

87. The Meeting recommended to governments that, as countries do not always follow the FAO standards above mentioned, they should indicate by way of footnotes in their publications, their statistical treatment of foreign landings and requests FAO to insert similar footnotes in questionnaires.

88. The Meeting also recommended to governments and international organizations that the nationality of the vessel should be used to determine the country of origin of direct foreign landings.

89. It further recommended to governments that arrangements should be made where necessary between governments to supply or exchange the data required by the international organizations on foreign landings where this is not already done. These data should be supplied in the same detail as required for other landings, i.e. classified by gear, area of fishery and time, and specifying catch and effort. Data on value should refer to value at first sale.

3.3.2.7 STATISTICS OF FISHERY ACTIVITIES OUTSIDE NORMAL COMMERCIAL CHANNELS (SPORT AND SUBSISTENCE FISHING)

3.3.2.7.1 General Remarks

90. In some countries, subsistence and/or sport fisheries account for a substantial part of the total catch of some species, and the catches taken in them are either included, wholly or in part, in the total input and output statistics for those species, or are excluded from the national statistics altogether, due to difficulties of collection.

3.3.2.7.2 Conclusions and Recommendations

91. The Meeting recognized the difficulty in obtaining information on subsistence fishing, but suggested that where it is believed to be significant, sampling techiques might be used to compute the effort and catch.

92. The increasing economic interest in sport fisheries was also noted, and the Meeting recommended that in those countries where this activity is significant, the catches should be recorded separately from the commercial fishery.

3.3.2.8 VALUE STATISTICS

3.3.2.8.1 General Remarks

93. Again, as with statistics of inputs, the need for value statistics of landings, especially by economists, was recognized by Committee I in its treatment of the statistics of outputs. Recommendations made by the Meeting concerning them are set out in Part 4, where a fuller treatment is given of price and value statistics for all industry phases.

PART 4

STATISTICS ON DISPOSITION, PROCESSING, DISTRIBUTION AND CONSUMPTION

PART 4

STATISTICS ON DISPOSITION, PROCESSING, DISTRIBUTION AND CONSUMPTION

4.1 GENERAL BACKGROUND

4.1.1 INTRODUCTORY REMARKS

1. Within each national statistical "structure" the particular statistical "system" covering the fishing industry (the economic activities constituting the primary production phase) is usually comparatively self-contained and fairly autonomous. However, in the statistical fields covering (a) the secondary production phase, i.e. industrial censuses and similar enquiries, (b) the tertiary phases, i.e. importation and exportation data, censuses of commercial establishments, etc., and (c) consumption, the data relating specifically to fishery matters are only part, often a very minor part, of these national statistics, which have a wide scope in terms of commodities and industries and activities.

2. In the past, due largely to their limited number the attention of fishery statisticians and economists was confined to studies of data of the primary phase. In consequence, it has not always been feasible to ensure that the fishery commodities, the fish-processing and preserving, fish-trading and consuming activities, etc. have received adequate treatment within the scope of their economic enquiries. It also happened that the various national statistical systems developed in distinct and somewhat different ways; often statistics relating to corresponding components of different countries could not be compared or integrated within a common system.

3. Among the more urgent problems now facing fishery statisticians, following the growth and extension of fishery economists' activities, are the following:-

   (a) How best to ensure an adequate coverage of fishery matters and aspects in those economy-wide censuses and similar enquiries, in import and export statistics, price statistics, transport data, consumption investigations, investment studies, etc., national accounts systems, etc.

   (b) How to eliminate the present differences between the various national systems and improve the possibilities at the national and international levels of linking, dove-tailing and integrating into one "cross-phase" system, all the data concerning catch and landings, fish-processing, trading, exporting, importing, fish-consuming activities, etc.

4. Subject matter of special relevance to the major current problems facing FAO, which unlike ICES and ICNAF is concerned with the publication of statistics of the secondary and tertiary phases in this field, was contained in documents WP/10, "Statistics of the Fish Processing Industry", and WP/11 "Statistics on the Distribution of Fish and Fish Products through Wholesale and Retail Channels", excerpts from both of which are combined together in Section 4.1.2 below. The requirements of economics and other users for these data are dealt with in Part 2.

5. In its consideration of the statistical problems highlighted in the various contributions, and currently facing the international organizations the Meeting dealt especially with the following items as being of major importance:-

   (a) Definitions and classifications of statistical items.

(b) Conversion factors.

(c) Direct foreign landings of preserved or otherwise processed commodities.

(d) Price and value statistics.

(e) Consumption statistics.

4.1.2 CONTRIBUTIONS

A. "STATISTICS OF THE FISH PROCESSING INDUSTRY"

6.

B. "STATITICS ON THE DISTRIBUTION OF FISH AND FISH PRODUCTS THROUGH WHOLESALE AND RETAIL CHANNELS" (Both by the UN Statistical Office)

The area of statistics falling within the field of interest of the Expert Meeting is very broad, covering as it does statistics relating to virtually every step from the taking or catching of fish to their consumption. Standards and recommendations of the Statistical Commission of the United Nations have a bearing on three aspects of this broad problem of collecting and compiling fishery statistics - namely, the question of classification of economic data, the problem of collecting and compiling basic industrial statistics and statistics relating to distribution.

It is the purpose of these papers to discuss briefly the broad classification problems presented by the fish industries within the context of the International Standard Industrial Classification of All Economic Activities (ISIC) 1/ and the objectives of basic industrial enquiries 2/ and their relation to the question of collecting and compiling data on fish processing and distribution 3/.

The usual objective of an economic enquiry is to obtain a fairly broad range of related data (e.g., production, consumption, sales, wages and salaries, inventories, etc.) 4/ concerning specific kinds of activity. Business records from which such a range of data can be derived are, in general, maintained on an institutional basis - i.e. for the enterprise, the establishment or the like. The ISIC was designed as a system of classification appropriate to the analysis of data gathered on an institutional basis - and, more specifically, it was devised for the classification of establishment

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1/ Statistical Papers, Series M, No. 4, Rev. 1.

2/ See International Recommendations in Industrial Statistics, Series M, No. 17; Studies in Methods: Industrial Censuses and Related Enquries, Series F, No. 4; and Draft Revisions to the International Standards in Basic Industrial Statistics, E/CN.3/L.40/Rev.1.

3/ This classification is given in Appendix I (see pp. 130-132).

4/ See Ibid. and International Recommendations in Statistics of Distribution, Statistical Papers, Series M, No. 26.

based data. The establishment was chosen as the classification unit 1/ both because it has been the most commonly used statistical and tabulation unit and because it is generally the unit most narrowly defined with respect to the kind of activity for which it is possible to collect the variety of data needed for economic analysis.

Since the ISIC was intended for use by all countries, the narrowest headings had perforce to include that mixture of activities common to single establishments in most countries. It was not possible, therefore, to adopt a single principle, such as the nature of the work done, the nature of the raw materials used or the end use of the products made, in defining the groups and major groups of the ISIC.

In the case of establishments combining a vertically integrated range of activities, the usual practice is to classify the establishment according to the end products. Thus, a brick works combined with a clay pit is classified to brick manufacturing although a part of its activities fall within the mining division. In the case of fishing, however, practical considerations as well as the usual classification practice of most countries led to a different treatment for fishing combined with processing when these activities took place on ships, and factory-vessel fishing is classified in its own group within the division reserved for "Agriculture, Forestry, Hunting and Fishing". While, however, factory-vessel fishing is not included, in the manufacturing division of the ISIC, distinction of factory-vessel activities from other types of fishing permits segregation of these manufacturing activities and provides for more complete coverage of the fish processing industry.

Among the main fishing countries of the North Atlantic, the United Kingdom, Canada and the United States classify factory-vessel fishing to the fishing industry. None of these countries, however, provides a separate group for factory-vessel operations. Canada, in fact, provides only a single group for all fishing activities, including inland water fishing. The Norwegian classification, on the other hand, makes provision for the distinction of factory-vessel operations in considerably greater detail than does the ISIC. Although the catching of whales from floating factories and from land stations is included as "fishing" in the Norwegian classification, certain other factory-vessel operations - such as, floating herring-oil factories - are classified to the manufacturing division.

Where a distinction is made between factory-ship operations and other fishing, the question of defining "processing" immediately arises. The line taken in drawing the distinction between factory-vessel and other ocean and coastal fishing in the ISIC was that the rudimentary processing such as salting, icing, splitting and gutting - activities almost universally carried out on board any fishing vessel - should not be considered "factory-type" operations. The process of canning, packing, quick-freezing or the extraction of oil, however, were considered to be truly manufacturing in nature and the presence of these activities on board a ship make it a

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1/ The establishment is the individual factory, mine or workshop, etc. in which goods and services are produced. It is distinguished from the enterprise, which is the owning and/or controlling entity and may consist of one or a number of establishments. See also Statistical Papers, Series M, No. 4, Rev. 1, Part I and E/CN.3/L.40/Rev.1.

(d) Value of stocks at beginning and end of enquiry year.

(e) Value of deliveries or consumption of goods and payments for services rendered during the enquiry year. (Separately distinguished are fuels, electricity, contract and maintenance work, and quantity and value of individually important raw materials.)

(f) Value of shipments or production of goods and receipts for services during the enquiry year. (Separately distinguished are quantity and value of individually important products, goods sold without processing, receipts for services.)

(g) Value of subsidies received during the enquiry year.

(h) Value of excise or other indirect taxes collected during the enquiry year.

It will be noted that the list is by no means exhaustive. Many kinds of data of considerable economic interest are not recommended either because they are not appropriate to an establishment statistical unit or because experience has shown that a particular item of data cannot be reported consistently. No items are included, for example, on most of the financial aspects of enterprises - precisely because these are items appropriate to the enterprise and not to the establishment 1/. On the other hand, it is not recommended that the total value of fixed assets be collected because the diversity of accounting practices with respect to depreciation and the difficulty of even defining a meaningful valuation technique make it improbable that much meaning could be attached to an aggregate figure for the value of fixed assets. Expenditure for fixed assets during the enquiry year are, however, recommended for collection.

With regard to the collection and compilation of statistics relating to the fish processing industry, the recommendations regarding the field of coverage and the statistical unit to be used for basic industrial enquiries has two practical consequences - (a) an industrial enquiry would exclude all fish processing activities found on board ships 2/ and (b) in those areas of manufacturing where the processing of fish products is commonly combined with the processing of other materials within single establishments, the isolation of all but a limited number of items of data concerning fish processing activities is impossible. Processing of marine oils beyond the stage of their extraction, production of animal feeds or fertilisers from fish meal and scraps, etc. are, as already pointed out, activities commonly carried on with the processing of materials other than those derived from fish.

1/ The Statistical Office of the United Nations is presently studying the possibility of formulating a set of recommendations in the field of enterprise statistics.

2/ As noted earlier, Norway considers floating herring-oil factories as part of manufacturing and hence includes them in the usual industrial surveys. The processing of whales, however, both on floating factories or on land is excluded.

factory-vessel. This, of course, is essentially the same problem that arises whenever it is necessary to distinguish manufacturing from the primary industries - mining, agriculture, fishing, etc. And as always there remain borderline cases. There are cod fishers, for example, whose only shipboard processing activity (in the sense mentioned above) is the extraction of cod liver oil.

A further difficulty in isolating fish processing from the catching and taking of fish occurs whenever a company operates a fish processing unit and a fleet of fishing boats to supply this unit. Ideally, of course, one would try to have these two activities separated for statistical reporting purposes, but the possibility of doing this will depend on the extent to which these activities are separated in the company's records.

Within the ISIC, all land based establishments processing fish are classified as manufacturing industries. This is in conformity with the customary practice of the North Atlantic countries, except for Norway. As mentioned earlier, the Norwegian classification includes certain factory-vessel operations in manufacturing and also assigns land based whaling operations to fishing.

Within the ISIC, a separate three-digit group - 204 Canning and preserving of fish and other sea foods - is provided for the processing and preserving of fish for food. However, separate groups are not provided for the processing of fish for oil or meal or for the mixing of fish scrap fertilisers or other fish by-products. Extraction of fish and other animal and vegetable oils are all combined in one group - 312 Vegetable and animal oils and fats - while mixing of fertilisers and animal feeds are likewise combined with the production of similar commodities from other material.

National classifications vary markedly with respect to the detail provided on fish processing. In general, however, as in the ISIC it is only within the food manufacturing industries that distinctions are made between fish processing and the processing of similar (for the purpose) raw materials. The Canadian and United States classification provide a special group for the classification of fish canning and preserving. In the Norwegian and United Kingdom classifications, on the other hand, only a single heading is provided for both meat and fish canning and preserving, although the Norwegian classification provides a separate heading for fish processing such as freezing, salting, etc.

According to the recommendations of the Statistical Commission 1/, a basic industrial enquiry should cover the fields of mining, manufacturing, construction and the production of electricity, gas and steam as defined by divisions 1, 2-3, 4 and 5 (excluding major group 52) of the ISIC. And just as the establishment is the recommended classification unit for the ISIC, so it is the recommended basic statistical unit for industrial enquiries. A list of the kinds of data recommended for collection in basic industrial enquiries is as follows:-

(a) Employment, man-hours and wages and salaries.

(b) Capacity of installed power equipment.

(c) Expenditure on fixed assets during the enquiry year.

1/ See also E/CN.3/L.40/Rev.1.

Particularly with the advent of modern techniques for the treatment - chemical and mechanical - of oils, fish oils are rapidly merged with the flow of other animal and vegetable oils and become indistinguishable from them. In these cases, then it is not possible to allocate specifically to fish processing the appropriate proportion of labour, capital, etc. employed.

In view of the above, what kinds of data regarding the fish processing industries can be expected from the usual basic industrial enquiry, and how might these data be supplemented to give a more complete account of the industry? The problem of obtaining data relating to that part of the fish processing industry not covered by an industrial enquiry can and has been solved by conducting supplementary enquiries. Norway, for example, annually surveys the fishing industry and obtains from this survey certain data regarding fish processing carried on by companies and establishments classified in the agriculture, forestry and fishing divisions. Of course, care must be taken that such a survey complements and does not overlap the industrial enquiry. That is, some companies may operate establishments falling within the industrial enquiry and also conduct factory-vessel operations. There is a danger that in such a case all activities of the company may be reported in both enquiries.

With regard to the isolation of an extended range of data regarding all fish processing and the identification of specific kinds of fish processing, the outlook is promising with regard to the processing of fish for food and, possible, for the extraction of marine oils, but not for other areas of the industry. As mentioned above, the establishment has in large part been recommended as the basic statistical unit for industrial enquiries because it is the most narrowly defined unit in terms of kind of activity which can in general provide a fairly extended range of data concerning its resources and activities. The difficulty arises, then, from the fact that many establishments, even though devoted entirely to the processing of fish, are engaged in several processing activities or stages. They are often, for example, engaged in production of fish for food and the production of fish oil and meal. Further, much processing of fish and fish products takes place in establishments engaged, often primarily engaged, in the processing of other materials as well. Thus, the canning of meat and fish is frequently combined, and, as already noted, the processing of marine oils beyond the extraction stage is most often associated with the processing of other kinds of oils. In view of these considerations, it is probable that the detailed commodity consumption and production data emanating from most basic industrial enquiries will provide the most fruitful basis for analysis of the processing of fish products as well as for the separation of different kinds of marine products produced and consumed. It may, of course, be possible to some extent, by distinguishing sub-units of the establishment, to collect certain additional items of data - primarily employment - related specifically to fish processing.

The limitation or the use of an industrial classification to distinguish certain narrowly defined kinds of activity makes it apparent that an industrial classification should be supplemented by a detailed commodity classification. Unfortunately no international agreement has been reached either on the form or content of such a classification and national systems differ widely with respect to level of detail and form. While it is possible, therefore, to make use of commodity data from industrial enquiries to analyse the fish processing activities within some countries, international comparison of these data is often very difficult.

It is, of course, obvious that the possibility of detailed analysis of distribution statistics by kind of products dealt in (i.e. kind of business is limited by the possibility of meaningfully assigning the items of data to be analysed to each individual "kind of business". Equally, the

possibility of making international comparisons of various aspects of specific kinds of business will depend on the degree of uniformity of classification of the pertinent items of data within the countries to be compared. Within the ISIC only two broad classification headings are recommended which simply distinguish wholesale from retail distribution activities - Groups 611 and 612 relating to wholesale and retail trade respectively. In addition, a possible sub-division of these groups has been offered which could be used to segregate establishments dealing in various groups of commodities. It will be noted that each of the possible sub-divisions of wholesale and retail trade suggested by the Commission includes a rather broad variety of commodity lines. This is also true of the sub-divisions of trade or commerce in all of the standard national classifications. There are two reasons for this. First, the ISIC, as well as the majority of the national classifications, is designed for the classification of establishment 1/ based data, since this is in general the most narrowly defined unit with respect to kind of business for which it is possible to collect all or most of the recommended items of data needed for economic analysis. Second, many commercial establishments handle a variety of commodities and it is not meaningful, therefore, to attempt to allot all the activities of these establishments to narrowly defined "kind of business" categories.

In addition to the fact that the diversified nature of commodities handled precludes the possibility of detailed classification of commercial establishments, the organization of wholesale and retail trade differs considerably from country to country. It is for this reason that no international agreement has yet been reached regarding the sub-division of wholesale and retail trade into "kind of business" categories 2/.

As a result of the above situation, isolation of so specific a kind of business as wholesaling or retailing of fish and fish products is virtually impossible.

The Statistical Commission has recommended 3/ that quinquennial or decennial, annual and monthly or quarterly enquiries be undertaken covering establishments engaged in wholesale and retail trade. The purpose of these enquiries is to obtain data describing the resources and activities of these important segments of the economy, and to follow the development of trade over time. As being particularly relevant to the analysis of the resources, activities and development of commerce, the Statistical Commission has recommended the collection and compilation of the following kinds of data:

(a) Employment and wages and salaries (not recommended for monthly or quarterly collection).

(b) Expenditures for and sales of fixed assets during the enquiry year (not recommended for monthly or quarterly collection).

(c) Inventories at beginning and end of the enquiry periods of goods intended for sale.

1/ See Statistical Papers, Series M, No. 26 for a definition of the establishment in wholesale and retail trade.

2/ See Statistical Papers, Series M, No. 26, Part I, Section D, p. 5.

3/ See also Statistical Papers, Series M, No. 26.

(d) Value of all sales during the enquiry period (collection of total value of sales is recommended for all enquiries, but collection of value of sales by kind of commodity and type of customer is recommended only for infrequent enquiries because of the difficulty of obtaining this information).

(e) Value of all purchases during the enquiry year of goods intended for sale. (Not recommended for monthly or quarterly collection.)1/

As for basic industrial enquiries, the establishment is the statistical unit recommended for the collection and compilation of the recommended items of data. Here, too, then, as in industrial surveys, the list of data must be restricted to items appropriate to the establishment and a number of economically interesting items of data such as those relating to financial matters are, therefore, omitted.

The commercial establishment is in general considerably less specialised than the industrial establishment. And, among commercial establishments, the retail units tend to be far less specialised than the wholesale. This is particularly true in those countries which have witnessed the growth of the "super market" during the last few years. In connection with the qeustion of specialization it may be interesting to examine a few of the figures relating to the distribution of fish and fish products for food that were compiled from the Canadian census of 1951. At that time the Canadian classification provided a specific group for wholesalers of fish and sea foods, except canned. Such wholesalers accounted for nearly 80 per cent of the sales of uncanned fish and sea food in 1951. At the retail level, a group was provided for purveyors of fresh fish, but these specialized markets accounted for only 23% of the sales of fresh fish while the vast majority of such sales took place in retail markets handling a general line of groceries and food-stuffs. Considering, therefore, that it is in the wholesaling and retailing of uncanned fish for food that there is the greatest degree of specialization, it is apparent that there is little hope for gathering data on resources and activities devoted specifically to the distribution of fish and fish products in general.

Here again, as in the case of fish processing, it is probable that detailed analysis of the distribution of fish and fish products can be undertaken only through an analysis of commodity data. Commodity analysis of the sales of wholesalers and retailers is, however, hampered not only by the lack of an international standard commodity classification, but by the fact that distributors frequently do not maintain sales records in adequate commodity detail for statistical purposes.

Appendix I

Listed below are the headings within which fishing and fish processing establishments might be classified in the International Standard Industrial Classification of all Economic Activities (ISIC).

04 Fishing

041 Ocean and coastal water fishing, excluding factory-vessel fishing.

Commercial fishing in ocean, coastal and off-shore waters, except in factory ships. This includes catching or taking of fish, crustacea and molluscs; seal hunting; gathering of sea weeds, sea shells, pearls, sponges and other ocean and coastal water products. The operation of oyster beds is also included.

1/ See also Statistical Papers, Series M, No. 26, for a more detailed listing of these items of data and their definitions.

042 Factory-vessel fishing.

Pelagic fishing in factory-type vessels for whales, sardines or other fish species. These vessels should be capable of preserving and processing or canning the catch.

043 Inland water fishing.

Commercial catching, taking and gathering of fish and uncultivated plant life in inland waters or artificial ponds. The operation of fish hatcheries and fishing preserves is also included.

20 Food Manufacturing Industries, except Beverage Industries.

Manufacture of foods for human consumption and of related products such as chewing gum, spices and prepared feeds for animals and fowls.

204 Canning and preserving of fish and other sea foods.

Preserving and processing fish and other marine foods. These processes include such operations as salting, drying, dehydrating, smoking, curing, pickling, packing in airtight containers, and quick-freezing. Icing, salting, filleting of fish catch are classified in groups 041 (Ocean and coastal water fishing, except factory-vessel fishing) or 043 (Inland water fishing), whichever is appropriate; and processing of the catch aboard fishing vessels is classified in group 042 (Factory vessel fishing).

209 Manufacture of miscellaneous food preparations.

Food industries not elsewhere classified, such as the manufacture of margarine, compound cooking fats and blended table or salad oils; starch and its products; baking powder; flavouring extracts and syrups; macaroni and similar products; yeast; condiments, mustard and vinegar; meat pies and food specialities; prepared feeds for animals and fowls; egg processing; spice grinding; coffee roasting; processing of tea leaves into black tea; edible salt refining; harvesting and storage of natural ice and the manufacture of ice, except dry ice. Dry ice manufacturing is classified in group 311 (Basic industrial chemicals, including fertilisers).

31 Manufacture of Chemicals and Chemical Products.

311 Basic industrial chemicals, including fertilisers.

The manufacture of basic industrial organic and inorganic chemicals such as acids, alkalis and salts; dye intermediates, dyes, colour lakes and toners; explosives and fireworks; synthetic fibres, resins, plastics, elastomers and rubber; and fertilisers. The manufacture of chemical materials for and of products of atomic fission or fusion is included.

312 Vegetable and animal oils and fats.

The production of crude oil, cake and meal, by crushing or extraction, from oilseeds and nuts; the extraction of fish and other marine animal oils; the rendering of inedible animal oils and fats; and the refining and hydrogenation (or hardening) of oils and fats, except lard and other edible fats from livestock. The manufacture of lard and other edible fats is classified in group 201 (Slaughtering, preparation and preserving of meat) and the

production of margarine, compound cooking fats and blended table or salad oils is classified in group 209 (Manufacture of miscellaneous preparations).

319 Manufacture of miscellaneous chemical products.

The manufacture of chemical products not elsewhere classified, such as medicinal and pharmaceutical preparations; perfumes, cosmetics and other toilet preparations; soaps and other washing and cleaning compounds; polishes; inks; matches; candles; and insecticides.

4.2 CLASSIFICATION OF FISHERY COMMODITIES

4.2.1 GENERAL REMARKS

7. In considering problems relating to fish and fish products, for the fishery industry as a whole, one is faced with a constant stream of fishery raw materials and semi-processed and fully-processed commodities, passing through the various fishery phases. The physical magnitude and value of the intake and output of the different kinds of fishery commodities can be measured over specified periods of time - seasons, days, weeks, years, etc. Statistics for each of these phases must be dovetailed, linked or integrated and the first indispensable step is the development of an adequate fishery commodity classification. Such classifications can serve, as statistical standards, the purposes of more than one statistical system, e.g. the import and export trade system, statistical systems for industrial censuses, for the censuses of commercial and service establishments, for wholesale and retail prices, etc.

8. The commodity classification used by FAO in its compilation of fisheries statistics, for publication in the Yearbook of Fishery Statistics, was presented in document SP/5 "Standard International Classification for Statistical Purposes" 1/.

9. This classification is based on the SITC (Standard International Trade Classification) developed by the United Nations' Statistical Office on the basis of earlier work done by the League of Nations. The Brussels Tariff Nomenclature has also been taken into consideration. In 1958 work was initiated, and is still continuing, on a code (SITC-BTN) to indicate the correlation between the Standard International Trade Classification and the Brussels Tariff Nomenclature. Discussions of the definitions of the "groups" have been published in "Purposes and Methods of Fishery Statistics", pp. 311-323. Definitions of the components appear in the notes to the various tables in Section F of the Yearbook of Fishery Statistics, Vol. XII.

10. The breakdown as far as the FAO "groups" (which correspond to the SITC "items" and the BTN "headings"), are only useful for broad summaries of production statistics and import and export statistics on a world basis. As these "groups" are too broad, it has become necessary to establish "sub-groups" for the arrangement of the various individual items appearing in the national statistics.

1/ This classification, FAO international Standard Statistical Classification of Fishery Commodities, approved by the Meeting and subsequently revised by the FAO/ICES/ICNAF Continuing Working Party on Fishery Statistics in the North Atlantic Area, is given in Annexes G and H.

11. This refinement in the shape of a further breakdown into "sub-groups" is used by FAO for the presentation of (a) production statistics regarding the output of preserved and processed commodities and (b) for the arrangement of the export commodity items for the major fish producing and exporting countries. Whilst minor importers and minor exporters appear to find it adequate to classify their import and export data to the SITC or BTN breakdowns only, the fish exporting countries usually have enough details to allow their product itemisation to be arranged within the framework of the more detailed FAO "sub-group" classification.

12. Taking each of the FAO groups in turn, some of the difficulties encountered in classifying national details within the FAO framework of fishery commodity "groups" and "sub-groups" are discussed below.

13. As a general remark on problems and ways to solve them, it should be stressed here that a significant amount of the difficulties experienced in interpreting national production statistics and import statistics concerning the fishery industry, would be eliminated by "keys", identifying each of the items in national statistics in terms of the FAO "groups" and "sub-groups". Furthermore, it would be very useful if the descriptive headings and definitions of these national items were carefully scrutinised to eliminate any dubious and ambiguous words such as "prepared", "preserved", "cured" and either in footnotes or in an extended description, explain clearly the meaning of such comparatively vague words.

14. When the Meeting examined the contents of this classification in detail, in the light of the present-day fishery products and processing methods used throughout the world, and their importance in economic surveys, etc., it endorsed its general suitability, and proposed a few modifications, of the definitions and nomenclature.

4.2.2 RECOMMENDATIONS

15. The Meeting recommended that FAO continues to use its FAO International Standard Statistical Classification of Fishery Commodities[1] in publications of FAO's Fisheries Division for the arrangement of national items and the presentation of statistics concerning (a) the production of processed and preserved fishery commodities, (b) international trade (imports and exports) in fishery commodities, and (c) other statistical fields in which such a classification is required.

16. The Meeting also recommended that FAO draws the attention of other international agencies interested in fishery commodity statistics to this classification.

17. It was also confirmed by the Meeting (a) that there is a growing demand for information on the production, import and export and the internal domestic trade in frozen fishery products; and (b) that there is also a demand for a clear indication of the composition of the production and the trade in terms of (i) filleted products and (ii) other fish products.

18. The Meeting was of the opinion that while frozen fish should preferably refer to quick-frozen, the practical difficulties of collections would make it inadvisable at present to confine sub-groups 113 and 114 to this type of fish product. It is hoped that in due course further consideration could be given to the possibility of further sub-dividing these sub-groups to show separately quick-frozen products.

19. Because of their importance in the North Atlantic Area the Meeting considered that herring should be given a separate heading both for (a) dried or salted, not smoked, and for (b) smoked; the latter to include frozen-smoked herrings.

1/ This classification, approved by the Meeting and subsequently revised by the FAO/ICES/ICNAF Continuing Working Party on Fishery Statistics in the North Atlantic Area, is given in Annexes G and H.

20. The Meeting proposed that in the definition of commodities used in FAO's Standard International Fishery Commodity Classification, the terminology should be in conformity with international usage current at the time 1/.

21. The Meeting supported the FAO proposal that in external trade statistics meals from aquatic animals should be distinguished from other animal meals and that in production statistics a further segregation of the fish meals and solubles into (a) white-fish and (b) oily fish (e.g. herring, sardines, pilchards, menhaden, etc.) should be made.

4.3 CONVERSION FACTORS

4.3.1 GENERAL REMARKS

22. In Section 3.3.2.4.1 the proceedings of and the recommendations of the Meeting are given, concerning current problems, difficulties and major needs with regard to the use of conversion factors, for providing standardized, comparable national and international output statistics for the Primary Phase. These problems were also dealt with by the Meeting for statistics of the Secondary and Tertiary Phases, with special reference to the provision of conversion factors for converting semi or fully processed fishery commodities into their landed and live weight equivalents.

23. In its treatment of this problem, the Meeting drew on material contained in document SP/6, "Fishery Statistics: Conversion Factors" (excerpts from which are given in Section 3.3.2.4.2.), and "Purposes and Methods in Fishery Statistics". The Committee's proposals on this subject were considered by the Meeting, together with those made by Committee I, for catch and landings statistics (see Section 3.3.2.4), and its recommendations, covering both sets of needs, already given in Section 3.3.2.4, are set out below.

4.3.2 CONCLUSIONS AND RECOMMENDATIONS

24. The Meeting stressed the need for a clear and precise indication of the various weight and measure units used in the tabulations appearing in national and international publications.

25. The Meeting recommended to governments that, as far as possible, the various publications should be carefully edited to ensure the use of precise terminology and abbreviations. It invited FAO to prepare and publish a volume in which would be listed the standard terms and abbreviations used for the different weights and measures encountered in the tabulations published nationally. Reference to this volume could then be made in the national publications.

1/ See paragraph 38 of the Report of the Expert Meeting on Fishery Statistics in the North Atlantic Area (Annex A, pp. 163). The term "in airtight containers" was used in the UN's "Commodity Indexes for the Standard International Trade Classification" (Statistical Papers, Series M, No. 10, indexed edition, April 1953). "Canned" was substituted for "in airtight containers" in "The Standard International Trade Classification and the 1955 Brussels Tariff Nomenclature" (UN Economic and Social Council, Statistical Commission, Eleventh Session. Document E/CN. 3/261, 7 January 1960. The term "in airtight containers" was again used instead of "canned" in the UN's "Standard International Trade Classification, Revised" Statistical Papers, Series M, No. 34.

26. The Meeting further recommended to governments that the weight equivalent of general capacity units and special fishery capacity units should as far as possible be presented in national publications where such capacity units are used. All national and international offices would profit from the consequent decrease in ambiguity.

27. FAO was invited by the Meeting to call the attention of individual governments to any specific instances at present giving rise to confusion.

28. Particular attention was drawn by the Meeting to the relation of landed weight (often the first stage at which weight or volume measurements are regularly obtainable) to retained catch, as live weight (the form required for international statistics). This relationship is of great significance in those fisheries where the catch is not only dressed but also processed before landing by means of salting, filleting, canning or reduction to meal and oil. The weight landed is also reduced by losses in transport such as losses of body fluids as well as decreases due to causes such as dehydrating, pulping and other factors which might be partly offset by measures taken to preserve the fish.

29. The Meeting noted that although in some cases conversion factors may vary between nations because of methods of fishing or transportation, nevertheless these factors should be made available internationally.

30. The Meeting therefore recommended that FAO seek from governments concerned information on the factors used to obtain equivalent live weight. The data should be given for each species and for each condition (gutted, filleted, etc.) in which the catch is landed. Particular attention should be given to those fish, e.g. for which no conversion factor is at present used, and to improving the accuracy of factors for salt fish and filleted fish, where the factor is very large. Accurate information on these factors will only be obtained by special observations on vessels at sea, at all seasons and on all fishery grounds under normal commercial conditions and it was suggested that these observations could be combined with those on discards. The factors should be kept under observation to check on possible changes with changes in commercial practice.

31. The Meeting recognised the importance at both the national and the international level of adequate extraction and yield rates and recommends that as far as possible the national offices should furnish to FAO detailed conversion factors to be used for converting various semi-processed and finally processed fishery commodities into their equivalent in terms of landed weight and live weight. It appears that these are already available in the records of many national offices concerned with fishery administration and that an exchange of information of this type would be of benefit to all concerned.

32. The Meeting noted that there are many considerations involved in the derivation of factors of this type which make it necessary to recognise that at the present stage these conversion factors should be interpreted as indicating merely the order of magnitude involved.

33. Keeping in mind the existing deficiencies in the statistics the Meeting was of the opinion that from the point of view of the industry and of the businessman, variations in weight during transport and storage ashore are not sufficiently large to justify the making of specific proposals.

34. The Meeting, however, recognised that in certain circumstances a slight variation in weight might lead to substantial variations in financial returns to individual traders.

4.4 DIRECT FOREIGN LANDINGS OF PRESERVED OR OTHERWISE PROCESSED COMMODITIES

4.4.1 GENERAL REMARKS

35. The statistical treatment of direct foreign landings is of concern not only to those responsible for primary production (catch and landings) data, as reported in Section 3.3.2.6, but also to those responsible for the following kinds of statistics:-

(a) processing data as part of industrial censuses;

(b) import statistics; and

(c) export statistics.

36. It is necessary to ensure not only similar approaches in each of the fields in all the countries but also to achieve a logical approach and solution to these problems arising within one country but in different sections of the national statistical system. The statistical solution adopted by fishing and landing statistics should correspond with those adopted in processing, importing, exporting, domestic trading statistics.

4.4.2 CONTRIBUTIONS

37. A. EXCERPTS FROM ANNEXES TO "STATISTICAL TREATMENT OF DIRECT FOREIGN LANDINGS" (L.P.D. Gertenbach) 1/

Industrial Censuses and related enquiries

Here are to be faced difficulties when trying to ensure that the coverage would take into account the manufacturing done abroad fishing craft, mother-ships and factory ships. While such censuses are often in a position to cover adequately shore-based operations, it appears that they will have to obtain the co-operation of the agencies collecting fishing statistics to ensure that, together with the normal catch and landings statistics, records will also be made of discharges of semi-manufactured and fully processed products. In these cases, the collected statistics should also make provision for the three categories mentioned in the primary fishing statistics:-

(a) Domestic discharges by the national craft;

(b) Discharges in foreign ports by the national craft; and

(c) Receipts from foreign fishing craft.

1/ Further excerpts from this contribution are included in Section 3.3.6.2, which also includes available material on the treatment of direct foreign landings by countries in their import and export statistics.

These statistics under (a) and (b) above should be collected to ensure that they will fit in with the patterns established for the input and output data reflecting shore-based activities. Those under (c) fall within the scope of import statistics and those under (b) fall under processing statistics as well as under export statistics.

External trade statistics

One phase of the problem of direct foreign landings is how they shall be treated in the external trade statistics of countries making such deliveries or of the ones receiving them. This problem has been discussed in several documents.

The analysis of current practices indicates that countries usually treat domestic catches and landings, whether or not taken in waters outside or inside the territorial waters as part of the national production and not as imports. However, in some countries, direct landings by foreign fishing craft are excluded from the import statistics while certain countries do not treat landings made directly into foreign territories by their own fishing craft as part of their exports.

There are cases where countries classify, as part of their imports, products which have been caught and manufactured on the high seas by their own craft. The United Kingdom, for example, showed until 1955 as imports its receipts of whale oil discharged from United Kingdom-owned and -operated whaling expeditions to the Antarctic.

Norway is an illustration of the instance where a country excludes from her export statistics, quantities of whale oil discharged directly in foreign ports by its factory ships when en route from the Antarctic back to home ports.

At present, these problems are related mostly to the items dealing with fresh and frozen fish and with whale oils. However, with the increasing development of mother-ship and factory-ship activities as well as processing on board trawlers, which may discharge their manufactured products either directly into the home country or into foreign ports, these problems will extend to such items in external trade as cured fish, canned fish, meals, oils and other by-products.

Activities of FAO and the UN Statistical Commission

At its seventh session, the Statistical Commission of the United Nations had requested the Secretary-General to consult with Member States on certain problems relating to the coverage of external trade statistics and to the methods of attributing imports and exports to countries of provenance and destination. The Commission discussed the results of these consultations on the basis of a memorandum by the Secretary-General (document E/CN.3/173)1/ Supplementary considerations on this subject were presented in memoranda by the United States (document E/CN.3/173 Add. 1), by the Netherlands (E/CN.3/173 Add. 2) and by the United Nations Food and Agriculture Organization (E/CN.3/173 Add. 3). The problems relating to coverage were concerned, on the one hand, with the question of whether each of the following categories of goods should be included in the main body of the external trade

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1/ Statistical Commission - Report of the Eighth Session, 5 - 22 April 1954 United Nations Economic and Social Council, document E/CN.3/192.

statistics or tabulated separately: (a) fish landed directly from fishing craft; (b) bunkers and stores delivered to foreign ships and air raft; (c) ships and aircraft, whether new or second-hand. On the other hand, there was the question of the definition of re-exports and of their separation from exports and from goods in transit.

Fish 1/ landed from the original fishing craft is at present treated differently in the statistics of different countries, but, since the countries having important trade of this kind wished it to be included in the statistics and since the representative from the United Nations Food and Agriculture Organization felt that such an inclusion would be useful in compiling trade and production figures for fish,

> "The Statistical Commission
>
> "Recommends that, wherever the size of landings is of importance and wherever it is possible to do so, countries should include in their import statistics fish landed directly from foreign fishing craft and include in their export statistics fish landed abroad by domestic fishing craft".

It was the opinion of the Commission that the attribution of provenance by flag of fishing craft would usually produce figures reasonably equivalent to country of provenance.

At its eighth session the Commission had recommended that wherever the size of fish landings was of importance and wherever it was possible to do so, countries should include in their import statistics fish landed directly from foreign fishing craft and include in their export statistics fish landed abroad by domestic fishing craft, and had asked that a proposal be formulated to extend the recommendation to other marine products.

The Commission 2/ adopted the following resolution:

Resolution 5 (IX)

The Statistical Commission

Endorses the proposals of the Food and Agriculture Organization of the United Nations that:

(a) Wherever they are important, marine products of all kinds be included in national import statistics when landed directly from a foreign fishing, hunting or gathering craft 3/ and be included in national export statistics when landed abroad directly from a domestic fishing, hunting or gathering craft;

1/ It was pointed out that the definition of fish and fishing craft would require further consideration by the Secretary-General in consultation with the Food and Agriculture Organization.

2/ Statistical Commission - Report on the Ninth Session, 16 April - 2 May 1956, United Nations Economic and Social Council, document E/CN.3/225.

3/ The description of craft should where appropriate, be taken to include mother-ships and other vessels which take part in the fish catching, fish processing and fish transportation and related operations.

(b) The same treatment be accorded, wherever they are important, to the result of processing marine products on board ships at (or en route from) the fishing, hunting or gathering grounds whether the process takes place on the original fishing, hunting or gathering craft or in another craft to which the goods were transferred at sea.

4.4.3 CONCLUSIONS AND RECOMMENDATIONS

38. The Meeting reviewed the recommendations of the Statistical Commission of the United Nations, outlined above, and stressed the need for uniformity in the treatment of external trade statistics both in the national statistical publications, and in their submission of these statistical data to FAO.

39. It adopted the following recommendation with regard to the reporting and publication of external trade statistics 1/.

40. The Meeting endorsed the international recommendations that landings in foreign ports from catches by the reporting governments fishing craft should be included in the landings as well as in the export statistics of the reporting government, while landings in the reporting country, from catches made by foreign craft should be treated as imports only. That is, such landings are reported as imports by the government of the country in which landed and as exports by the country of the fishing vessel.

41. It agreed that the products of factory-ships delivered directly to foreign countries should be treated statistically as production of the country to which the unit belongs; the government of the country to which the factory-ship belongs should treat such foreign landings also as exports, and the receiving country should treat its receipts as imports.

42. The Meeting proposed that the fishery commodity classification should be used in external trade statistics; it also recommended that in both import and export statistics, direct foreign landings for each country of origin or of destination should be compiled and that these should be distinguished from conventional imports and exports.

4.5 PRICE AND VALUE STATISTICS

4.5.1 GENERAL REMARKS AND CONCLUSIONS

43. As itemised in Part 2, the requirements of some users of fishery statistics include not only physical measures of inputs and outputs, but also their monetary equivalents. This applies especially to fishery economists.

44. Hitherto, although some national and international statistical publications have included some data, usually in the form of average values of landings at first sale, no reporting structure has been built up for these data, as comprehensive as that for the physical measures, in either national or international publications.

1/ Recommendation (i), the first part of (ii), and others of particular relevance to the primary phase statistics, are also set out in section 3.3.6.4.

45. In the absence of a specific contribution to the Meeting, concerned with this subject, no detailed consideration was given to remedying the current deficiencies and difficulties in supplying these data. The Meeting considered, in fact, that this subject should be dealt with by a group of experts at a later date, when the needs, especially at the international reporting level were more clearly defined.

46. The Meeting took note of the needs for both price and aggregate value statistics, and it invited attention of countries collecting this information to the following:

(a) The price and values for landings should be that obtained at first sale for the product as landed. Any subsidy, tax or other transfer payment should be shown separately and should be clearly defined and where possible, allocated to species.

(b) At the secondary and tertiary levels of the fishery industry, both price and value statistics are useful for purposes of market information and determination of value added. Market prices should be reported and any subsidies or supplementary payments made in transactions taking place at the processing, wholesaling or retailing phases should be clearly distinguished, if possible.

(c) The prices and values reported in connection with national import trade and export trade in fishery products should conform to the definitions set out by the Statistical Commission of the United Nations.

(d) Prices and values of inputs (i.e. costs) in the fisheries should also be reported to show separately the market price or value, as distinct from subsidy or other supplementary payments, wherever it is possible to make a segregation of this kind.

(e) If at all possible, values reported for capital stock should be the cost of acquisition by the present owners. In addition, information on the date of acquisition should be supplied. In any event, the basis of the valuation should be clearly stated in national publications and in international reporting.

4.6 CONSUMPTION STATISTICS

4.6.1 GENERAL REMARKS, CONCLUSIONS AND RECOMMENDATIONS

47. Not only FAO but also other intergovernmental bodies are interested in obtaining regularly data on the per capita fish consumption in the various countries.

48. Although fishery products are one of the commodities of great significance in human nutrition, its inclusion and statistical treatment in food balance sheets and in the calculation of the per capita fish consumption by the various populations have not yet been successfully solved.

49. It is generally accepted that in calculating the total available supply of fish it is necessary to have data relating to the following:-

(a) domestic fish production;

(b) the quantities used for non-food purposes, such as those used for the

reduction to fish meal and oil;

(c) the quantities of condemned fish and inedible fish;

(d) data on imports;

(e) data on exports;

(f) stocks at the beginning; and

(g) at the end of the period.

50. Even if all these figures relating to intake and output at the various stages are available it is by no means an easy task to determine the net supply available in a country for consumption by the human population.

51. The data relating to the quantities at the different stages are often on different weight bases. Gross primary production may be on a landed weight basis while imports, exports, and stocks will be on the net product weight basis. Quantities for reduction may be in terms of the live weight. Therefore, before they could be included in the required calculation it is necessary to reduce all the data to a common weight basis. For this purpose yield and extraction weights and similar conversion factors are indispensable.

52. It appears to FAO that the first step in the improvement of fish consumption data would be the determination and provision of adequate yield and extraction rate data for the fishery raw materials and the various semi-processed and fully processed commodities produced or consumed in the various countries.

53. Because of the different weight bases used in the various aggregates from which the total available supply is determined, FAO has experienced considerable difficulty in preparing reliable figures for <u>per capita</u> consumption of fish.

54. The Meeting recommended to governments, that in future, individual countries should prepare these estimates as they would have the detailed knowledge of the weight bases of the various items.

55. The Meeting discussed the relative difficulties of expressing consumption figures on an edible weight or on a round fresh weight basis. It was of the opinion that it should be left to each government to choose its own methods of compilation but recommended that all governments should convert to a live weight basis and that it is most desirable that figures on an edible weight basis should be given as well.

PART 5

REPORTING OF FISHERY STATISTICS

5.1 INTRODUCTORY REMARKS

1. The statistical services of the three sponsoring organizations, FAO, ICES and ICNAF, are all concerned with the compilation and publication of fishery statistics for the whole or parts of the North Atlantic region. The ICES and ICNAF publications are confined to fishing industry (primary phase) statistics for the north-eastern and north-western areas respectively, while FAO publishes these, and statistics of later phases for the whole North Atlantic region, as part of its world-wide coverage. Therefore, the detailed statistical submissions by countries to these organizations have much in common, and many of the countries with fisheries in both the north-eastern and north-western parts of the North Atlantic supply statistical data to all of them.

2. Hitherto, the submissions of data to these organizations have been made independently of one another, according to reporting schemes drawn up by each. This has resulted in some unnecessary duplication of data at the national statistical offices, and also some lack of comparability and consistency between the data published by the three organizations. Moreover, the statistical data have been submitted to the three organizations at different times, leading to delays in the appearance of the statistical publications.

3. One of the most important tasks of the Meeting was, therefore, to examine the current methods of reporting adopted by countries to the three international organizations, with a view to finding ways for simplifying, standardizing and speeding up the reporting procedure.

4. Essential basic requirements for achieving this objective are the adoption, internationally, of standard definitions and terminology and a common classification of statistical items. Each of these subjects were therefore treated in detail by the Meeting, and the proceedings and recommendations concerning them are reported in earlier chapters. Definitions and terminology for primary phase statistics of outputs are dealt with in section 3.3.2.2, while the classification of statistical items for the primary, secondary and tertiary phases, are reported in Sections 3.3.2.3 and 4.3 respectively. The treatment of direct foreign landings for the primary and later industry stages, which is also of major relevance to the task of simplification and standardization of reporting, is dealt with in Sections 3.3.2.6 and 4.5. The subject of conversion factors is also of direct relevance, and is dealt with in Sections 3.3.2.4 and 4.4.

5. In addition to these topics, the Meeting also examined the following further relevant items:

   (a) Simplification of the tasks of countries, in reporting statistical data to the international bodies.

   (b) Timeliness of reporting.

   (c) The breakdown of the statistical data, published by ICES and ICNAF by area.

5.2 PROCEEDINGS AND RECOMMENDATIONS

5.2.1 SIMPLIFICATION OF THE TASK OF THE REPORTING COUNTRIES: STANDARD REPORTING FORM

6. Statistics are now received, and published by the three international agencies, in the following form 1/:

	Submitted	Published
FAO	Nominal catch Landings	Nominal catch Landings
ICES	Nominal catch	Nominal catch
ICNAF	Landings	Nominal catch

7. This table shows that of the three international agencies, only FAO publishes data of landings. ICES and ICNAF both publish nominal catch (= the round fresh weight equivalent of the landings) data. The FAO landings data are published for each country as nearly as possible in the form in which that country's national fishery statistical tables are compiled. The Meeting therefore agreed that it would be advisable that no change be made by countries in reporting landings to FAO. At the same time FAO asked member countries to review, each year, the previous years figures submitted for publications.

8. While the catch data published by both ICES and ICNAF are in the form of nominal catches, countries report the data to them in different forms. ICES receives data from countries directly as nominal catches, while ICNAF receives them as landings, and conversion to nominal catches is undertaken at the ICNAF statistical office, using conversion factors for different types of landed product, derived from data supplied by countries. In view of the fact that the conversion can, for the most part, be undertaken most efficiently within countries, the Meeting agreed that it would be advantageous for the conversion to nominal catch to be undertaken by each country, as for the ICES submissions, and that ICNAF be recommended in future to request statistics from member countries in that form.

9. As a further step towards achieving greater efficiency and economy of effort in reporting, the Meeting considered that it would be much simpler, both for member countries and for the international organizations if one standard form could be provided on which all reports would be made. This would show for each area and for each type of fishing effort, the nominal catch by species. It was emphasized that the new form would require the same information in the same detail as hitherto, but this would now be supplied according to a standard pattern suitable for use by all three organizations.

1/ For definitions of terms see Section 3.3.2.2.

10. The Meeting considered and approved a draft of such a standard form 1/, and it recommended that the governments of Canada, the Federal Republic of Germany, Iceland and the United Kingdom should be asked by the international organizations to use it on an experimental basis for reporting their 1959 nominal catches and fishing efforts. On the basis of the experience gained, final forms should be prepared and circulated for reporting the 1960 statistics 2/.

11. The Meeting recommended that the forms should be completed in duplicate by each country, one copy being dispatched to FAO and another to either ICNAF or ICES, as appropriate. Since all governments, of countries fishing in the North Atlantic region report to FAO, the Meeting proposed that FAO be requested to prepare and distribute the forms. It was further agreed that FAO should notify both ICES and ICNAF at the time of dispatch of the forms, so that these organizations would have an opportunity of reminding their member governments of their requirements.

12. The Meeting also recommended that the order of species groups adopted by FAO 3/ should be used on the reporting form, and that ICES and ICNAF, whilst not each requiring the same amount of detail, or necessarily the same species order should accept the order and merely extract from the table furnished the information required by them.

13. The Meeting noted that at present the statistics furnished by some countries are incompletely broken down by species. The quantities listed as "various", "unsorted" or "unidentified" often constitute a major part of the total catch. This reduces the usefulness of the statistical material. The Meeting therefore recommended to governments that the quantity of fish reported as unsorted and unidentified should not exceed 10 per cent of the total catch, or 10,000 metric tons, whichever is the smaller. It recommended further that Governments, which have difficulties in recording their catches in the required detail, should use sampling techniques to apportion the unsorted and unidentified quantities to the species or species groups reported.

14. The Meeting also recommended that, when forwarding the nominal catch data to the international organizations, member countries should supply a statement, on an agreed form, showing the conversion factors applied to bring the landings up to the nominal catch; at the same time, they should supply a statement showing the factors used in apportioning unsorted and unidentified fishes. The international organizations should note the conversion factors used, and, in order to ensure conformity, should discuss with the countries concerned any unexplained wide variations.

1/ The draft forms, drawn up at the Meeting, have subsequently been modified by the Continuing Working Party on Fishery Statistics in the North Atlantic Area at its first session, Bergen, May 1960, and at its second session, Washington D.C., June 1961.

2/ Delays in the preparation of the standard reporting form prevented this being done for the 1959 statistics, but steps have already been taken to undertake the experimental trial for the 1960 data.

3/ FAO International Standard Statistical Classification of Aquatic Animals and Plants, see Annex F.

5.2.2 TIMELINESS IN REPORTING

15. At present the dates by which statistical data are asked for annually by FAO, ICES and ICNAF are different; furthermore all member countries do not appear able to provide statistics by the required date. In recommending the revised form of reporting, the Meeting recognized that some revision of the dates by which the statistics are required, must be accepted. It therefore recommended to governments that all returns be submitted to the international agencies by 1st May of the year following that to which the statistics refer. If a breakdown in the detail required is not available by that date, member countries should forward a summary of catches on the standard form, and the return by regions and types of fishing effort be forwarded as soon as possible thereafter.

5.2.3 BREAKDOWN OF DATA BY AREA 1/

16. As reported in document WP/8 _/, statistics of catch and fishing effort are now broken down by statistical rectangles in some ICES publications. This is done to meet the needs especially of fishery scientists, and has proved possible because data are collected by member countries in the North East Atlantic for a system of unit areas (30' latitude by 1° longitude), established many years ago. As shown in document WP/9 _/, ICNAF, on the other hand, only receive statistical data, according to a sub-area or sub-division breakdown. In view of the importance of having data available by small area sub-divisions, especially to meet the biologists' needs, the Meeting recommended that ICNAF be asked to consider the adoption of this system in its area.

17. The ICNAF, "Statistical Bulletin " and the ICES, "Bulletin Statistique", both publish statistics for the West Greenland and Newfoundland areas. The Meeting considered that this duplication is unnecessary and not in accordance with its aims of simplification of reporting and publishing the statistical data. The Secretary of the Meeting therefore instructed to write to ICES and ICNAF, drawing their attention to this question.

1/ The Continuing Working Party on Fishery Statistics in the North Atlantic Area at its First Session, Bergen, Norway, May 1960, recommended the following terminology for fishing areas in statistical reporting:

Region:	NORTH ATLANTIC	
	ICNAF	ICES
Area:	The whole of the Convention Area.	The whole of the area for which ICES statistics are collected.
Sub-area:	Sub-area as defined in the Convention (area covered by one panel) - designated by arabic numeral.	Statistical area designated by roman numeral.
Division:	First subdivision of sub-area designated by capital letter.	First subdivision of sub-area designated by roman numeral plus lower case letter.

2/ See Section 2.6.2 (B).

3/ See Section 2.6.2 (C).

PART 6

SUMMARY AND CONCLUSIONS

6.1 GENERAL REMARKS

1. As the proceedings and recommendations reported in Part 3 - 5 show, the main objectives and subject matter of the Meeting were concerned with improving, simplifying and standardising the system of routine statistics reporting at the international level, in meeting the basic, long-term needs of the main categories of users, as summarised in Part 2, and especially fishery biologists. In consequence, many items of subject matter of importance either to the specialist user at the national level, or relevant to a special ad hoc investigation, requiring detailed specialised statistical data, were not dealt with by the Meeting. Further, attention was focussed on the difficulties and problems facing the statistical offices of the international agencies, in fulfilling their function of publishers of statistical data, rather than on the compilation and publication systems adopted by national governments. National problems were only considered in so far as they affected the fulfilment of the international agencies' requirements.

2. Within these terms of reference, the Meeting made substantial progress towards eliminating many of the current deficiencies in the statistical data published by the three international agencies concerned, in achieving a greater degree of comparability and conformity between them, and in simplifying and streamlining the system of reporting. The recommendations concerning the latter (see Part 5) are of major importance, and pave the way for a substantial saving of time and economy of effort at the national level as well as at the statistical offices of each international agency. The associated items, concerning definitions, terminology and classification of items, and the problem of conversion factors 1/ are of fundamental importance, and constitute a basic necessity for achieving this aim.

3. Because of the exclusive interest of ICES and ICNAF in fishing industry statistics, the major part of the Meeting proceedings was directed towards this phase. Further, the problems associated with supplying the needs of fishery biologists received greater attention than those of other users. The recommendations, concerning input (fishing effort) statistics, (including the classification of fishing fleets), reported in Section 3.2.4 and of data on discards reported in Section 3.3.5 are of particular relevance to their needs.

4. At the same time, a first attempt was made by the Meeting to define the basic statistical requirements of the other major group of specialist users - fishery economists. The recommendations of the Meeting on this topic, reported in Section 2.2.2, while not forming the basis of a comprehensive statistical reporting system, pave the way for a more detailed and comprehensive assessment of the economists' statistical needs, and the subsequent formulation of an appropriate international reporting system.

6.2 SUMMARY

5. In summing up the achievements of the Meeting, Mr. F.E. Popper, FAO, referred to the complexity of the structure on which the present international reporting systems are based, and emphasised the importance of meetings of experts to seek

1/ See Sections 3.3.2, 3.3.3 and 3.3.4.

improvements to its components. He drew attention to the large number of specific recommendations made by the Meeting, which together provided for major improvements in the statistics published by the international organizations. However, this could only be achieved by effective and prompt implementation of them. Further, changes in the requirements of the users, and in the structure of the national statistical organizations might at any time highlight new problems and difficulties, not covered by this Meeting, but which would require the same sort of technical evaluation as those considered here. In fact, the situation needs to be kept under constant review, both as regards the implementation of the recommendations of this Meeting, and regarding new, unforeseen problems and difficulties.

6. The need for a formal mechanism for fulfilling this important requirement was endorsed by the Meeting, and it proposed the setting up of a continuing working party.

7. The Meeting invited the governments of Canada, the Federal Republic of Germany, Iceland and the United Kingdom, and ICES, ICNAF and FAO to appoint one expert each to form a continuing working party on fishery statistics in the North Atlantic area with the power to co-opt additional members to help them in their task.

8. The working party should keep under continuous review the progress made in the implementation of the recommendations of the Meeting, consult with the officers of governments and of international organizations with respect to difficulties encountered and, keeping in mind the actual state of fishery statistical services in the different countries, make suggestions for further national and international action in its field to governments and international organizations as appropriate.

9. The Meeting requests the Director-General of the Food and Agriculture Organization of the United Nations to arrange for its Fisheries Division to function as Secretariat for the meetings of this working party.

10. At the conclusion of its business the Meeting commenting on the preparation of reports of its proceedings:-

(a) instructed the General Secretary to transmit advance copies of the report 1/ to the three sponsoring organizations with the request that they consider implementation of the recommendations contained in it;

(b) instructed the General Secretary to ask FAO to transmit the report to the governments invited to participate in the Meeting, and other international organizations concerned with a similar request that they also consider implementation of recommendations in the report.

11. The Meeting invited FAO in due course to publish a fully documented edition of the Report.

12. The Chairman concluded the Meeting with expressions of thanks to those attending for their active participation in the proceedings of the conference.

1/ This report has been circulated as ESTANA/8, Revised, 4 February 1960.

ANNEX A

REPORT OF THE EXPERT MEETING ON FISHERY STATISTICS IN THE NORTH ATLANTIC AREA

(Paragraphs 1-91)

CHAPTER A

(Paragraphs 1-9)

OPENING FORMALITIES AND ORGANIZATION OF MEETING

1. The Meeting was officially opened by Lord John Hope, Joint Parliamentary Under Secretary of State for Scotland, at 10.45 on Tuesday morning, 22 September, 1959. Lord John Hope's address of welcome is attached as Annex I.

2. After expressing thanks for this welcome on behalf of the three sponsoring international organizations (the Food and Agriculture Organization of the United Nations, the International Council for the Exploration of the Sea, and the International Commission for the Northwest Atlantic Fisheries) Mr. F.E. Popper (FAO) called for nominations for Chairman for the Meeting. Mr. A.J. Aglen (U.K.) was elected after nomination by Dr. S.D.J. van Dijk (Netherlands), seconded by Mr. H. Angerman (Norway).

3. After his opening remarks (given in full in Annex II), in which he outlined the scope and main aims of the Meeting, the Chairman drew attention to the proposed agenda and working arrangements, contained in document ESTANA/3. He asked for the adoption of the Agenda (see below) and of the plan to set up two Committees, one (Committee I) to deal with items 6 and 7 of the Agenda for the fishing industry statistics, and the other (Committee II) to deal with these items for the statistics of the processing and distribution industries and of consumption.

4. These proposals were accepted by the Meeting and the following Agenda was formally adopted:

(1) Opening of meeting
(2) Election of Chairman and other officers
(3) Adoption of Agenda
(4) Organization of work
(5) Requirements for fishery statistics
(6) Difficulties in meeting high priority requirements and their solution
(7) Further improvement in fishery statistics
(8) Adoption of report and recommendations
(9) Any other business

5. The Chairman then called for nominations for two Vice-Chairmen for the Meeting, who would undertake the chairmanships of Committees I and II respectively.

Mr. J.B. Rutherford (Canada) was elected for Committee I - proposed Mr. H.H.A. Whitworth (U.K.), seconded by Mr. S.N. Sørensen (Denmark).

1/ Reproduced in Part 1, paragraph 13 (pp. 5-7 of this publication).

2/ Reproduced in Part 1, paragraph 14 (pp. 7-10 of this publication).

Dr. S.D.J. van Dijk (Netherlands) was elected for Committee II - proposed Mr. E.A. Power (U.S.A.), seconded Dr. M. Rauterberg (Germany).

Mr. J.A. Gulland (U.K.) was appointed rapporteur for Committee I and Mr. W. Ros (Netherlands) for Committee II.

6. The Meeting agreed that the programme under items 6 and 7 of the Agenda should be restricted to a number of specific topics of current importance in the field of international fishery statistics. The following list of topics was adopted:

	Com. I	Com. II	Plenary
(1) Classification of statistical items	X	X	-
(2) Manpower statistics in the fishing industry	X	-	-
(3) Conversion factors	X	X	-
(4) Incompleteness of coverage of statistics			
(a) Statistics of discards	X	-	-
(b) Treatment of foreign landings	X	X	-
(c) Statistics of fishery activities outside normal commercial channels (sport and subsistence fishermen)	X	X	-
(d) Loss of weight of fish during transport	X	X	-
(5) Statistics of fishing effort	X	-	-
(6) Statistics of processing			
(a) At sea	X	X	-
(b) Ashore	-	X	-
(7) Statistics of distribution			
(a) Domestic	-	X	-
(b) Foreign trade	-	X	-
(8) Statistics of consumption	-	X	-
(9) Simplification of statistical reporting to the international bodies	-	-	X
(10) Price and value statistics	-	-	X

7. Seventy participants and observers from fourteen countries and six international organizations, interested in the statistics of the fishery industries and commerce in the North Atlantic area attended the Meeting in Plenary Session and at the various sessions of the Committees and Working Parties. The full list of the names, positions and addresses of all participants and observers is given in Annex XIV 1/; the officers of the meeting are listed in Annex XV 2/.

1/ Reproduced as Annex B of this publication.
2/ Reproduced as Annex C of this publication.

8. The basic working papers, supplementary working papers, background papers and other documents prepared for the Meeting are listed in Annex III 1/.

9. The Meeting concluded its business at 18.00 hours on Tuesday 29 September.

CHAPTER B

(Paragraphs 10-22)

REQUIREMENTS - Agenda Item 5

B.1 GENERAL

10. The main users of Fishery Statistics were categorized as follows:

(a) Fishery administrators
(b) Businessmen and industrial organizations
(c) Fishery scientists (biologists and gear technologists)
(d) Economists
(e) Food technologists.

B.2 SCIENTISTS (FISHERY BIOLOGISTS AND GEAR TECHNOLOGISTS)

11. Attention was first paid to the statistical requirements of the fishery biologists since their assessments are at present the basis of international fishery regulation and their requirements are the main concern of the ICES and ICNAF statistical offices. Further they are concerned only with statistics of the primary phase (fishing industry statistics).

12. The Meeting agrees that their requirements as enumerated in the relevant Meeting documents can be defined broadly as follows:

(i) statistics of output in terms of the size and composition of the gross catch of each species (or group of species) exploited in the fishing;

(ii) statistics of input in terms of the kind (selectivity) and amount of effective effort expended by the fishery.

13. These statistics are required in suitable units and with sufficient time and area breakdown and accuracy for the estimation of reliable indices of abundance of the exploited fish stocks.

14. The current difficulties in fulfilling these basic requirements and the question of the timeliness in reporting them were referred to Committee I for more detailed consideration.

15. So far as international statistics reporting is concerned, the gear technologists' requirements can be broadly identified with those of the fishery biologist.

1/ Reproduced as Annex D of this publication.

B.3 ECONOMISTS

16. After some discussion of the general nature and importance of economic statistics of the fishery industries, an ad hoc working party was set up to examine the problem in more detail and specify the basic requirements in this field. Its report is attached as Annex IV 1/.

17. These requirements can be specified in general terms as the statistics of input and output, in both physical and monetary terms, for each phase of the industry, specified where appropriate, as to area, or fishery, and time.

18. The Meeting agrees, relative to these requirements, to the following recommendations:

(i) "....that the international bodies concerned should give early consideration to their likely requirements in this (economic) field and to state them as fully as possible."

(ii) "....that governments give consideration to obtaining the economic information outlined above (see Annex IV 1/) by

(a) using sample surveys;
(b) extending present censuses of industry;
(c) setting up effort categories that can be effectively related to cost "factors" derived from sources (a) and (b);
(d) any other method."

(iii) "....that governments when undertaking sample surveys and censuses collaborate with the international bodies in exchanging information about techniques used."

(iv) "....that governments should treat the fishery industries at all stages of production, processing, distribution and marketing in no less detail in national statistics than are other branches (sectors) of the economy, and should remedy any existing deficiencies."

B.4 FOOD TECHNOLOGISTS

19. The Meeting agrees that, at present the food technologists' statistical requirements were of a specialized nature, outside the general scope of international statistics reporting. It is recognized, however, that statistics of spoilage (condemned fish) form an important item of the food technologists' special requirements, which might be covered in international fishery statistics.

B.5 FISHERY ADMINISTRATORS, BUSINESSMEN AND INDUSTRIAL ORGANIZATIONS

20. The Meeting agrees that for supplying their long and short term needs the fishery administrator and businessman require statistics of input and output for all phases of the industry in both physical and monetary terms. Their broad requirements are therefore of the same general nature as those of the fishery economist and/or fishery scientist.

21. The nature of their functions often demand day-to-day statistics, especially of production, marketing and distribution.

1/ Reproduced in Part 2, paragraph 16 (pp. 31-34 of this publication).

22. Attention is also drawn, however, to the importance of international trade statistics (import and export) to these categories of users, and the Meeting agrees that the present publication of these statistics by FAO should be continued, and, if possible, extended in scope and coverage.

CHAPTER C

(Paragraphs 23-90)

DIFFICULTIES IN MEETING HIGH PRIORITY REQUIREMENTS, THEIR SOLUTION AND FURTHER IMPROVEMENT IN FISHERY STATISTICS - Agenda Items 6 and 7

C.1 GENERAL

23. The items listed in paragraph 6 were dealt with, as appropriate, by Committees I and II as a whole or by ad hoc working parties. Working parties were set up to examine the following topics:

Committee I -

(1) Conversion factors and allied topics;
(2) Statistics of discards (Annex VI 1/);
(3) Fishing effort statistics (Annex VII 2/);
(4) Fishing industry manpower statistics.

Joint-Committees -

(1) Definition and classification of statistical items published by the international organizations and the simplification of statistical reporting to them (Annex V 3/).

(2) Price statistics.

24. The reports of those ad hoc working parties which are attached as separate annexes, are indicated in paragraph 23 and their recommendations, as adopted by the Committees and approved by the Meeting in plenary are given in the succe paragraphs.

C.2 DEFINITIONS AND CLASSIFICATIONS OF STATISTICAL ITEMS

I - C A T C H _S_T_A_T_I_S_T_I_C_S

25. The Meeting recommends to Governments and international bodies the adoption in their statistical publications of the following terms:

Gross catch

The weight of the fish taken from the sea.

(Paragraph 25 continued)

1/ Not reproduced in this publication, but largely covered by Part 3, paragraphs 71-80 (pp. 110-111).
2/ Not reproduced in this publication, but partly covered in Part 3, paragraphs 14-25 (pp. 95-97), and paragraphs 29-35 (pp. 98-99).
3/ Not reproduced in this publication, but largely covered by Part 5.

25. (concluded)

Discarded catch

That part of the gross catch which, as whole fish, is returned to the sea at the time of capture.

Retained catch

That part of the gross catch which, as whole fish, is not discarded.

Landings

The weight of fish and fish products brought ashore.

Nominal catch

The live-weight equivalent of the landings.

Note: The difference between retained catch and landings is accounted for by:

(1) Consumption by the crew;

(2) Use for bait;

(3) Dumping of guts, heads and other parts of retained fish;

(4) Dumping of fish (whole or processed) because of spoilage or for other reasons;

(5) Loss or gain of fluid content.

Synonyms

Gross catch - Real catch

Nominal catch - Landings round fresh

The Meeting also recommends that the term landings should not be used synonymously with number of arrivals or trips.

Where English is used in national publications the above terms should be adopted; for their French and Spanish equivalents see this Report in these languages; where countries use other languages they should notify the international organizations of equivalent terms in these languages.

II - E F F O R T S T A T I S T I C S

26. The Meeting suggests to governments that the following two-way classification is a sufficient basis for supplying effort data for both inshore and offshore fisheries to ICES and ICNAF. It recognizes, however, that additions or revisions may be necessary as other types of gear come into commoner use, or to make the list conform to international standard terminology.

(a) Boat Categories: All classes of fishing craft should be specified according to method of propulsion as follows:

1. Steam
2. Motor
3. Sail
4. Oars

(Paragraph 26 continued)

26. (concluded)

(b) Gear Categories:

1. Otter trawl
2. Pair trawl
3. Beam trawl
4. Danish seine
5. Ring net (including purse seine)
6. Beach seine
7. Drift gill net
8. Bottom gill net
9. Fixed gear (including weirs, traps, pots, creels, etc.)
10. Long-line
11. Hand-line
12. Other line
13. Dory vessel
14. Dredge (scallop, oyster, etc.)
15. Harpoons

27. The Meeting recommends that Governments should further break down the "Boat Categories" as follows:

1. Steam - (a) coal
   (b) oil

2. Motor - (a) gasoline
   (b) diesel and diesel-electric

and that international organizations consult with the Governments to ascertain progress made in this matter with a view to eventual international collection and publication of national statistics.

28. At present both ICES and ICNAF use a breakdown by gross tonnage although these agencies do not have a common classification. The Meeting agrees that this basic classification by tonnage classes be retained and recommends that ICES should classify fishing craft over 500 gross tons, by the same classes currently used by ICNAF. Although the tonnage categories used by ICES and ICNAF for craft below 500 gross tons are not uniform, this may not pose a major problem at present since there are relatively few vessels between 100 and 500 gross tons, fishing in areas of common interest. The Meeting recommends, however, that this problem be studied further by the secretariats of the international organizations with the object of making proposals for a wholly uniform classification.

29. In addition to this broad tonnage classification there is a need for a definition of the effort in terms of other factors which seem likely to be related to fishing power and cost. Therefore the Meeting also recommends that in the case of otter trawlers, statistics of engine horse-power and vessel length be included in publications. The most suitable scheme would be to retain as the basic classification gross tonnage (modified as above). Within these broad classes it is desirable to specify the average gross tonnage, the average engine horse-power, and the average length, these averages being weighted according to the length of time each unit operates.

30. It is recognized that gross tonnage, horse-power, and length may not be the only important factors in measuring fishing power and fishing costs for otter trawlers or other craft. It is proposed that to obtain information on the importance of other factors in relation to fishing power and fishing costs, an inventory of vessel characteristics comparable to that currently being compiled by ICNAF should be compiled by each country and supplied to the international organizations to which they report.

III - MANPOWER

31. The Meeting recommends to governments and international organizations that -

(a) Reporting governments should in general follow the International Standard Classification of Occupations established by ILO.

(b) All seagoing personnel on fishing craft should be called fishermen, and all craft predominently engaged in the primary fishing industry should be classified as fishing craft.

(c) Fishermen should be reported under the following three classifications:

(i) Full time
(ii) Part time
(iii) Occasional

(d) In the interests of standardization and international comparisons these classifications need to be defined as follows:

(i) Full time - a man who receives at least 90 per cent of his livelihood from fishing or who spends at least 90 per cent of his working time fishing.

(ii) Part time - at least 30 per cent but less than 90 per cent.

(iii) Occasional - under 30 per cent.

Note: Time spent on shore occupation directly connected with fishing operations to be considered as fishing time.

(e) Sport fishermen should be excluded from manpower statistics.

(f) The attention of the ILO should be drawn to the fact that part time fishermen may be engaged in a wide range of other occupations.

(g) In the national classification of workers by occupation the fishing industry should receive no less treatment than that given to other industries.

IV - FISHERY COMMODITIES

32. The Meeting has reviewed the proposed FAO standard international fishery commodity classification and the revised version is presented in Annex X 1/.

33. The Meeting recommends that this classification be used by FAO in the publications of its Fisheries Division for the arrangement of national items and for the presentation of statistics concerning (a) the production of processed and preserved fishery commodities, (b) international trade (imports and exports) in fishery commodities, and (c) other statistical fields in which a commodity classification is required.

34. The Meeting also recommends that FAO draws the attention of other international agencies interested in fishery commodity statistics to this classification.

35. The Meeting confirms (a) that there is a growing demand for information on the production, import and export and the internal domestic trade in frozen fishery products; and (b) that there is also a demand for a clear indication of the composition of the production and the trade in terms of (i) filleted products and (ii) other fish products.

1/ This classification, FAO International Standard Statistical Classification of Fishery Commodities, is reproduced as Annex H of this publication.

36. The Meeting is of the opinion that while frozen fish should preferably refer to quick-frozen, the practical difficulties of collections would make it inadvisable at present to confine sub-groups 113 and 114 to this type of fish product. It is hoped that in due course further consideration could be given to the possibility of further sub-dividing these sub-groups to show separately quick-frozen products.

37. Because of their importance in the North Atlantic Area the Meeting considers that herring should be given a separate heading both for (a) dried or salted, not smoked, and for (b) smoked; the latter to include frozen-smoked herrings.

38. In order to retain conformity with established international usage the Meeting proposes that in the definition of commodities in Division 2 of FAO's standard international fishery commodity classification the term "in airtight containers" is used instead of "canned" 1/.

39. The Meeting supports the FAO proposal that in external trade statistics meals from aquatic animals should be distinguished from other animal meals and that in production statistics a further segregation of the fish meals and solubles into (i) white-fish and (ii) oily fish (e.g. herring, sardines, pilchards, menhaden, etc.) should be made.

C.3 SIMPLIFICATION OF STATISTICAL REPORTING TO INTERNATIONAL ORGANIZATIONS

40. FAO publishes each year landings for each country as nearly as possible in the form in which that country's national fishery statistical tables are compiled. At the same time FAO asks member governments to review the previous years' figures. The Meeting agrees that it would therefore be advisable that no change be made in the form of reporting landings to FAO.

41. The Meeting recommends however that since the statistics submitted to and published by the international organizations are (apart from the landings published by FAO and referred to above) in the form of nominal catch (as defined in paragraph 25), ICNAF be recommended in future to request statistics from member countries in that form.

42. The Meeting considers that it would be much simpler both for governments and for the international organizations if one standard form could be provided on which all returns of nominal catch and effort data to the international agencies would be made. This would show for each region and for each type of fishing effort the nominal catch by species. It was emphasized that the new form would require the same information in the same detail as hitherto but this would now be supplied according to one standard pattern suitable for use by all three international organizations.

43. It is recommended that two or three governments should be asked by the international organizations to use such a form on an experimental basis for reporting their 1959 nominal catches and efforts. On the basis of the experience gained, final forms should be prepared and circulated for the reporting of the 1960 statistics.

44. The Meeting recommends that the forms should be completed in duplicate by each country, one copy being dispatched to FAO and another to either ICNAF or ICES, as appropriate. Since all governments of countries fishing in the North Atlantic area report to FAO, the Meeting requests that organization to prepare and distribute the forms. FAO should notify both ICES and ICNAF at the time of dispatch so that these organizations would have an opportunity of reminding their member governments of their requirements.

1/ See footnote 1/ on page 134.

45. The Meeting recommends that the order of species groups 1/ adopted by FAO should be used on the propsoed reporting form and that ICES and ICNAF, whilst not each requiring the same amount of detail or necessarily the same species order, should accept the order and merely extract from the tables furnished the information required by them.

46. It is recommended to governments that all returns be submitted to the international agencies by 1st May of the year following. If a breakdown in the detail required is not available by that date member countries should forward a summary of catches on the standard form and the return by regions and types of effort be forwarded as soon as possible thereafter.

47. The Meeting also recommends to governments that the quantity of fish reported as unsorted and unidentified should not exceed 10 per cent of the total nominal catch or 10,000 metric tons whichever is the less. Governments which have difficulties in recording their catch in the required detail should use sampling techniques to apportion the unsorted and unidentified quantities to the species or species groups reported.

48. It was noted that catch and effort data are now being broken down by statistical rectangles in some ICES publications. This has proved possible because data are collected by member governments of countries in the North East Atlantic by a system of Unit Areas established many years ago. In view of the increasing importance of having data available by small areas, the Meeting recommends that ICNAF should be asked to consider the adoption of this system in its Area.

49. The Meeting notes that ICES and ICNAF both publish statistics for the West Greenland and Newfoundland areas. The Meeting considers this to be unnecessary and not in accordance with its aims of simplification of reporting and publishing the statistical data. The Secretary is instructed to write to ICES and ICNAF drawing their attention to this question.

C.4 CONVERSION FACTORS AND ALLIED TOPICS

50. The Meeting stresses the need for a clear and precise indication of the various weight and measure units used in the tabulations appearing in national and international publications.

51. The Meeting recommends to governments that as far as possible the various publications should be carefully edited to ensure the use of precise terminology and abbreviations. It invites FAO to prepare and publish a volume in which would be listed the standard terms and abbreviations used for the different weights and measures encountered in the tabulations published nationally. Reference to this volume could then be made in the national publications.

52. The Meeting further recommends to governments that the weight equivalent of general capacity units and special fishery capacity units should as far as possible be presented in national publications where such capacity units are used. All national and international offices would profit from the consequent decrease in ambiguity.

53. The Meeting invites FAO to call the attention of individual governments to any specific instances at present giving rise to confusion.

1/ FAO International Standard Statistical Classification of Aquatic Animals and Plants, see Annex F.

54. The Meeting draws particular attention to the relation of landed weight (often the first stage at which weight or volume measurements are regularly obtainable) to retained catch, as live weight (the form required for international statistics). This relationship is of great significance in those fisheries where the catch is not only dressed but also processed before landing by means of salting, filleting, canning or reduction to meal and oil. The weight landed is also reduced by losses in transport such as losses of body fluids as well as decreases due to causes such as dehydrating, pulping and other factors which might be partly offset by measures taken to preserve the fish.

55. The Meeting notes that although in some cases conversion factors may vary between nations because of methods of fishing or transportation, nevertheless these factors should be made available internationally. The Meeting therefore recommends that FAO seek from governments concerned information on the factors used to obtain equivalent live weight. The data should be given for each species and for each condition (gutted, filleted, etc.) in which the catch is landed. Particular attention should be given to those fish, e.g. for which no conversion factor is at present used, and to improving the accuracy of factors for salt fish and filleted fish, where the factor is very large. Accurate information on these factors will only be obtained by special observations on vessels at sea, at all seasons and on all fishery grounds under normal commercial conditions and it is suggested that these observations could be combined with those on discards. The factors should be kept under observation to check on possible changes with changes in commercial practice.

56. The Meeting recognizes the importance at both the national and the international level of adequate extraction and yield rates and recommends that as far as possible the national offices should furnish to FAO detailed conversion factors to be used for converting various semi-processed and finally processed fishery commodities into their equivalent in terms of landed weight and live weight. It appears that these are already available in the records of many national offices concerned with fishery administration and that an exchange of information of this type would be of benefit to all concerned.

57. The Meeting proposes that FAO should assemble the available information by issuing questionnaires of the type proposed in Annexes XII and XIII 1/.

58. The Meeting notes that there are many considerations involved in the derivation of factors of this type which make it necessary to recognize that at the present stage these conversion factors should be interpreted as indicating merely the order of magnitude involved.

59. Keeping in mind the existing deficiencies in the statistics the Meeting is of the opinion that from the point of view of the industry and of the businessman, variations in weight during transport and storage ashore are not sufficiently large to justify the making of specific proposals.

60. The Meeting, however, recognizes that in certain circumstances a slight variation in weight might lead to substantial variations in financial returns to individual traders.

1/ Not reproduced in this publication.

C.5 STATISTICS ON FISH DISCARDED AT SEA

61. The Meeting agrees that information on fish discarded at sea is necessary to bridge the gap between the retained catch and the total killed. The expression "fish discarded", in normal usage, refers only to the difference between the retained catch and the gross catch. However, the Meeting considers that as the biologist is primarily interested in the total killed, rather than the gross catch, it is necessary to consider all ways in which the retained catch might fall short in the total killed.

62. The Meeting recognizes that complete statistics on these "sources of loss" are not generally available but need to be estimated from experimental and sampling data. The Meeting recognizes that special experience will be necessary to estimate this loss that therefore there is little likelihood of regular statistics being obtained.

63. The Meeting recommends to governments that every country should send observers to sea on representative sizes and kinds of vessel and to every fishing ground. They should collect information on the numbers, quantities and size composition of fish lost and discarded, for each species individually. As far as possible, an attempt should also be made to determine what proportion of these are dead or dying.

64. The Meeting recognizes that owing to the various methods of treating the catch on different vessels, no one procedure can be outlined for collecting information on fish discarded and instead, recommends that governments compile reports describing their methods used for estimating and measuring discards.

C.6 STATISTICAL TREATMENT OF DIRECT FOREIGN LANDINGS

65. The Meeting endorses the international recommendations that landings in foreign ports from catches by the reporting government's fishing craft should be included in landings as well as in the export statistics of the reporting government, while landings in the reporting government from catches made by foreign craft should be treated as imports only. That is, such landings are reported as imports by the government of the country in which landed and as exports by the country of the fishing vessel.

66. The Meeting agrees that the products of factory-ships delivered directly to foreign countries be treated statistically as production of the country to which the unit belongs. The government of the country to which the factory-ship belongs should treat such foreign landings as exports and the receiving country should treat the receipts as imports.

67. The Meeting agrees that these are desirable standards to achieve but recognizes that many governments are facing difficulties in conforming to them, particularly in obtaining data of direct landings in foreign ports sufficiently detailed to incorporate them with domestic production statistics. The Meeting therefore recommends that the government of the country in which the "foreign" landings are made should communicate to the government of the country to which the vessel belongs particulars on species, quantities and values of the landings in question.

68. The Meeting recommends to governments, as countries do not always follow the FAO standards above mentioned, that they should indicate by way of footnotes in their publication their statistical treatment of foreign landings and requests FAO to insert similar footnotes in questionnaires.

69. The Meeting recommends to governments and international organizations that the nationality of the vessel should be used to determine the country of origin of direct foreign landings.

70. The Meeting recommends to governments that arrangements should be made where necessary between governments to supply or exchange the data required by the international organizations on foreign landings where this is not already done. These data should be supplied in the same detail as required for other landings i.e. classified by gear, area of fishery and time, and specifying catch and effort. Data on value should refer to value at first sale.

C.7 SUBSISTENCE FISHERIES AND SPORT FISHERIES

71. The Meeting recognizes the difficulty in obtaining information on subsistence fishing but suggests that where it is believed to be significant, sampling techniques might be used to compute the effort and catch.

72. The increasing economic interest in sport fisheries is noted, and in those countries where this activity is significant, it is recommended that the catches be recorded separately from the commercial fishery.

73. The Meeting agrees that the statistical coverage of the activities of sport and subsistence fishermen does not arise in the context of processing and national distribution activities but that in some countries it might be of importance in considering consumption levels. The Meeting decides to make no proposals for uniform statistical treatment of these activities but wishes to suggest to countries in which the quantity of fish involved is relatively large that they should make reliable estimates if no regular figures can be obtained.

C.8 STATISTICS OF FISHING EFFORT

74. General experience has shown that the number of operations of the fishing gear, multiplied by the length of time operated where appropriate, is a suitable index of fishing effort. It is recommended therefore that every attempt should be made by governments to collect such data by appropriate areas and time intervals.

75. The Meeting agrees that in the case of otter trawling, the most realistic index is the number of hours fishing, and it recommends to governments that, where possible, this information should be reported. It is agreed that this should mean "total number of hours during which the otter trawl was on the bottom and fishing". It further recommends that in the absence of information on "hours fishing" the closest possible approximation to this value should be reported with a precise indication of the methods employed in computing it.

76. As an alternative or in addition to "hours fishing", many countries collect data on "fished days" usually defined as "the number of days" on which any fishing took place. The Meeting recommends that this definition be generally adopted, and regards these statistics as of value to research workers in studying operational characteristics of fishing units.

77. In the case of fishing gear categories other than otter trawls, similar consideration should be given by governments to the reporting of the number of units of operation, and their average time set. For example in the case of fishing by long-line or other hook and line, it is necessary to report the number of hooks and the hours fished. In the case of Danish seining it is important to arrive at a standard definition of the length of time fishing. Until such a standard is agreed upon, it is recommended that the definition used by governments in collecting statistics be reported to the international agencies.

78. The Meeting recommends to governments that research should be carried out on the measurement of effort for fisheries in which searching constitutes an integral part of the fishing operation.

79. The Meeting agrees that for certain fisheries, information on the intention to fish particular species is an important aid to biologists in cases where the intention of the skipper can ordinarily influence his catch but cannot be ascertained from catch statistics alone, and recommends to governments that attempts should be made to collect and report it. In those cases where effort can be assigned unambiguously to a particular species of a mixed catch it should be separately reported to and published by the international organizations.

C.9 STATISTICS ON DISPOSITION, PROCESSING, DISTRIBUTION AND CONSUMPTION

80. The Meeting on considering the usefulness of the data on the disposition of the catch at present collected by FAO and published in section E of the FAO Yearbook of Fishery Statistics expresses appreciation of the work of FAO in preparing the figures on the disposition of the total world catch. The Meeting recommends that in so far as statistics concern the disposition of the national catches it would suffice to collect the information on catch disposition for each country for their total catch and for herring only, in addition to the preparation of a table by FAO on the disposition of the total world catch as in the past. Governments are requested to supply these figures for the following six categories:

(a) for use fresh
(b) for freezing
(c) for curing
(d) for canning (including all kinds of preserving in airtight containers)
(e) for reduction (meal and oil manufacture)
(f) for other purposes (pet-food manufacture, bait, etc.)

81. The Meeting recommends that countries be asked to regard factory-ship operations as extensions of fish processing activities carried out on land and that statistics be compiled for the factory-ship operations, comparable with those compiled for land activity. The Meeting recognizes that, because of the small number of units involved, separate publication of data on factory-ship operations is not practicable in a number of countries. However, governments which are in a position to publish this information should be encouraged to do so.

82. The Meeting agrees that the products of factory-ships delivered directly to foreign countries be treated statistically as production of the country to which the unit belongs.

83. The Meeting recommends to governments that more attention should be given to the fish processing industry in general industrial censuses. Because of the importance in some countries of relatively small individual fish processing units the Meeting recommends that periodic enquiries be held to gather information on the magnitude of any such units excluded from the general industrial census. The Meeting suggests that such an enquiry should be carried out at least every ten years but that it should be restricted to a few important items such as manpower, annual turnover, annual input, capital invested, etc.

84. The Meeting recommends that increased attention be given by governments to the regular collection of information on commodity and product output and disposition, including stocks or holdings and that they should collaborate with FAO in order to make it possible for that organization to begin at an early date, the publication of international series on these subjects.

85. The Meeting proposes that the fishery commodity classification already proposed in paragraphs 32 and 33 should be used in external trade statistics. The Meeting recommends that in both import and export statistics, direct landings for each country of origin or of destination should be compiled and that these should be distinguished from conventional imports and exports.

86. The Meeting considers that the statistical treatment of products of factory-ships delivered directly to foreign countries should be identical with that already recommended for foreign landings of unprocessed fish.

87. The Meeting recognizes that discrepancies exist between the import and export figures of fish commodities for pairs of countries. These discrepancies may be attributed partly to incorrect recording of countries of origin or destination and to lack of information on origin or final destination. The Meeting wishes to suggest that governments of countries in which the quantity of fish involved is relatively important, should make reliable estimates if no regular figures can be obtained.

88. Because of the different weight bases used in the various aggregates from which the total available supply is determined FAO has experienced considerable difficulty in preparing reliable figures for *per capita* consumption of fish. The Meeting, therefore, recommends to governments that, in future, individual countries should prepare these estimates as they would have the detailed knowledge of the weight bases of the various items. The Meeting discussed the relative difficulties of expressing consumption figures on an edible weight or on a round fresh weight basis. The Meeting is of the opinion that it should be left to each government to choose its own methods of compilation but recommends that all governments should convert to a live weight basis and that it is most desirable that figures on an edible weight basis should be given as well.

89. The Meeting recognizes that details of special equipment used in fish processing, storage, etc. would be of considerable use to fish technologists and others but it agrees that it would be extremely difficult to compile precise information of this type in a statistical form suitable for international comparisons.

C.10 PRICE AND VALUE STATISTICS

90. The Meeting, taking note of the needs for price and aggregate value statistics invites attention of countries collecting this information to the following:

(a) The price and values for landings should be that obtained at first sale for the product as landed; any subsidy, tax or other transfer payment should be shown separately and should be clearly defined and where possible, allocated to species.

(b) At the secondary and tertiary levels of the fishery industry, both price and value statistics are useful for purposes of market information and determination of value added. Market prices should be reported and any subsidies or supplementary payments made in transactions taking place at the processing, wholesaling or retailing phases should be clearly distinguished, if possible.

(c) The prices and values reported in connection with national import trade and export trade in fishery products should conform to the definitions set out by the Statistical Commission of the United Nations.

(Paragraph 90 continued)

90. (concluded)

(d) Prices and values of inputs (i.e. costs) in the fisheries should also be reported to show separately the market price or value, as distinct from subsidy or other supplementary payments, wherever it is possible to make a segregation of this kind.

(e) If at all possible, values reported for capital stock should be the cost of acquisition by the present owners. In addition, information on the date of acquisition should be supplied. In any event, the basis of the valuation should be clearly stated in national publications and in international reporting.

CHAPTER D

(Paragraph 91)

CONCLUSIONS

91. On the completion of the proceedings the following conclusions were agreed by the Meeting:

A. (i) The Meeting instructs the General Secretary

(a) to transmit advance copies of the report to the three sponsoring organizations with the request that they consider implementation of the recommendations contained in it;

(b) to further ask FAO to transmit the report to the governments invited to participate in the Meeting, and other international organizations concerned with a similar request that they also consider implementation of its recommendations.

(ii) The Meeting invites FAO in due course to publish a fully documented edition of the report.

B.* (i) The Meeting invites the Governments of Canada, the Federal Republic of Germany, Iceland and the United Kingdom, and ICES, ICNAF and FAO to appoint one expert each to form a continuing Working Party on Fishery Statistics in the North Atlantic area with the power to co-opt additional members to help them in their tasks.

(ii) The Working Party should keep under continuous review the progress made in the implementation of the recommendations of the Meeting, consult with the officers of governments and of international organizations with respect to difficulties encountered and, keeping in mind the actual state of fishery statistical services in the different countries, make suggestions for further national and international action in its field to governments and international organizations as appropriate.

(iii) The Meeting requests the Director-General of the Food and Agriculture Organization of the United Nations to arrange for its Fisheries Division to function as Secretariat for the meetings of this Working Party.

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* See Annexes J and K

ANNEX B

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(1) Conversion Factors and allied topics.....	A. MacDonald (U.K.)
(2) Fishing Effort Statistics.	L. M. Dickie (Canada)
(3) Manpower Statistics.....	W. H. Williams (U.K.)
(4) Fish discarded at sea.....	R. Jones (U.K.)

COMMITTEE II

Chairman.....	D. J. van Dijk (Netherlands)
Rapporteur.....	W. Ros (Netherlands)

WORKING PARTIES APPOINTED AT PLENARY SESSIONS

	Working Parties	Topic Leader
(1)	Economic Statistics.....	A. Scott (Canada)
(2)	Simplification of Statistical Reporting to the International Bodies....	F. S. Allen (U.K.)

ANNEX D

LIST OF PAPERS AND OTHER MEETING DOCUMENTS

A. Basic Working Papers

		Author
WP/1	Report on a survey of fishery statistics of the main countries fishing the middle and North Atlantic Area.	F. J. Rashley and J. B. Rutherford
WP/2	The use of fishery statistics by research biologists.	S. J. Holt
WP/3	The use of fishery statistics by research economists.	A. Scott
WP/4	The use of fishery statistics by government and business in Northwest Europe.	G. M. Gerhardson
WP/5	The use of fishery statistics by business and government in North America.	J. B. Rutherford
WP/6	Soviet system of fishery statistics.	V. Shparlinsky
WP/7	Fishery statistical requirements of FAO.	L.P.D. Gertenbach
WP/8	Fishery statistical requirements of ICES.	A. Fridriksson
WP/9	Fishery statistical requirements of ICNAF.	R. S. Keir
WP/10	Statistics of the fish processing industry.	U.N. Statistical Office
WP/11	Statistics on the distribution of fish and fish products through wholesale and retail channels.	U.N. Statistical Office
WP/12	Statistics on fish consumption and fishery commodities in food balance sheets.	-
WP/13.1	Country statements supplementing: "A report on a survey of fishery statistics of the main countries fishing the middle and North Atlantic Area" (Part I).	-
WP/13.2	Country statements supplementing: "A report on a survey of fishery statistics of the main countries fishing the middle and North Atlantic Area" (Part II).	-

B. Supplementary Working Papers

		Author
SP/1	Operation statistics in relation to the measurement of fishing effort.	J. A. Gulland
SP/2	Classification in fishing fleet statistics.	J. Lundbeck
SP/3	-- 1/	
SP/4	Statistical treatment of direct foreign landings.	L.P.D. Gertenbach
SP/5	Standard international fishery classification for statistical purposes.	L.P.D. Gertenbach
SP/6	Fishery Statistics Conversion factors.	L.P.D. Gertenbach
SP/7	-- 1/	
SP/8	The statistical needs of the designer of large trawlers and ship-borne processing plant.	G. C. Eddie
SP/9	The measurement of fishing power and its relation to the characteristics of vessels.	Biology Branch FAO B. B. Parrish and R. S. Keir
SP/10	Special problems of concern to ICNAF.	R. S. Keir

C. Background Papers

		Authority
BP/1	Purposes and Methods in Fishery Statistics: Report of the First International Meeting on Fishery Statistics held in Copenhagen, Denmark, 26-30 May 1952.	FAO
BP/2	Yearbook of Fishery Statistics, Volume I through IX (1947-1958) - (Volumes X, XI and XII were issued in 1959-61 after the Meeting)	FAO
BP/3	Yearbook of Fishery Statistics (Supplement 1: Selected sources of fishery statistics).	FAO
BP/4	Bulletin Statistique des Pêches Maritimes 2/	ICES
BP/5	Statistical News Letters	ICES
BP/6	Statistical Bulletin	ICNAF
BP/7	Sampling Yearbook, No.I.	ICNAF
BP/8	Studies in Methods: Industrial Censuses and Related Enquiries. Series F, No. 4, Vol. I.	UN, 1953

1/ Papers not prepared for the Meeting.

2/ See also the Report of the Statistical Committee, 49th Statutory Meeting of ICES, Charlottenlund, October 1961.

C. Background Papers (continued)

BP/9	Studies in Methods: Industrial Censuses and Related Enquiries. Series F, No. 4, Vol. II.	UN, 1953
BP/10	Handbook of Statistical Organization. Studies in Methods. Series F, No. 6	UN, 1954
BP/11	International Standard Industrial Classification of all Economic Activities. Statistical papers, Series M, No. 4, Re. I.	UN, 1958
BP/12	Indexes to the International Standard Industrial Classification of all Economic Activities. Statistical papers, Series M, No. 4, Add. 1	UN, 1956
BP/13	International Standard Definitions for Transport Statistics. Statistical papers, Series M, No. 8.	UN, 1950
BP/14	Commodity Indexes for the Standard International Trade Classification. Statistical papers, Series M, No. 10. 1/	UN, 1953
BP/15	International Standards in Basic Industrial Statistics. Statistical paper, Series M, No. 17. 2/	UN, 1953
BP/16	International Recommendations in Statistics of Distribution. Statistical papers, Series M, No. 26.	UN, 1958
BP/17	Methods Used in Compiling the United Nations Price Indexes for Basic Commodities in International Trade, Statistical papers, Series M, No. 29.	UN, 1958
BP/18	World Weights and Measures. Handbook for Statisticians. Statistical papers, Series M, No. 21.	UN, 1955
BP/19	Survey of Social Statistics. Statistical papers, Series K, No. 1.	UN, 1954

1/ See also Standard International Trade Classification, Revised. Statistical Papers, Series M, No. 34, United Nations, 1961.

2/ See also International Recommendations in Basic Industrial Statistics. Statistical Papers, Series M, No. 17, Rev. 1, United Nations, 1960.

ANNEX E

REPORT ON A SURVEY OF FISHERY STATISTICS OF THE MAIN COUNTRIES FISHING THE MIDDLE AND NORTH ATLANTIC AREA 1/

A. REVIEW OF PROBLEMS IN MEETING INTERNATIONAL REQUIREMENTS

A detailed account of all problems faced by national governments in meeting the statistical requirements set out in ..... of this report would require many pages. However, these problems may be arranged in broad groups or types, each of which contain features generating difficulties for national governments in complying with the agreed international requirements. And it may be noted in passing (although the matter is dealt with in greater detail in a later section) that the situation is not without irony, because the same international requirements are established by the representatives of the national governments themselves.

In the majority of instances, the problems vary from country to country in terms of relative magnitudes, rather than absolute presence or absence. It is only in a minority of cases that countries are unable to supply any statistics on any single subject. But in many instances, an over-anxiety of countries to comply and to supply tends to affect the quality and reliability of the statistics. As a result many of the series published by international agencies represent aggregates of data ranging from those of high reliability and accuracy at the top of the scale to statistics in the form of "guesstimates" at its bottom end.

Examination of the problems suggests that a classification based upon the difficulties in meeting requirements would approximate the following:

(a) The burden of work -

In setting requirements there has been an increase in both the volume and the detail of the statistics requested. National governments, in some instances, have not been able to add competent staff and the necessary equipment commensurate with the increase in work load.

(b) Concepts, definitions and terminology -

Partly because of lack of agreement, and partly because of lack of documented sources of reference on concepts, definitions and terminology, countries find difficulty in providing appropriate statistics. Also, in some instances, national governments in attempting to improve their statistics are hampered by doubts about the international requirements. These doubts are the result of lack of clarity in some instances, but there is doubt also arising from questions of the real usefulness of some of the statistics.

1/ Reproduction of Sections 3.1, 3.2 and 3.3 of "Report on a survey of fishery statistics of the main countries fishing the Middle and North Atlantic Area" (Estana WP/1) prepared by FAO Consultants, Fred J. Rashley and John B. Rutherford.

(c) Timing -

The timing of the release of international statistics should be governed by the time at which the data become available for the principal countries, or for those countries accounting for a major portion of the statistics. Some countries find difficulty in meeting present deadlines for return of information.

The burden of meeting requirements of international agencies cannot be determined only by a count of the statistical series required. A considerable proportion of the increase in burden is represented in the task of recalculating and rearranging original or basic statistics. Data must be supplied in one form, such as converted, for one agency, while another will require it as it is first reported in the national statistical system. This applies particularly to catch and/or landing data. In several countries the rearranging of data is a time and labor-consuming operation and is the cause of concern to officials. The nature of the material being manipulated and the conscientiousness with which the task is undertaken in most countries are factors important in contributing to the work burden. While mechanical tabulation might ease the burden for certain countries, for many countries mechanization is not feasible nor could it be justified from a cost viewpoint. Most of the difficulties presented by international requirements relate to the arranging of catch and/or landing statistics covering operations of the deep sea fishing fleets.

The requirements involving an accounting of the disposition of the catch or landings appear to add substantially to the work burden. There is an uneven development of "product" information from country to country. As a result, these countries lacking in product information must, in order to provide disposition statistics, set up estimating procedures (and "estimating" is to be interpreted widely here). In some instances the procedures of estimating are assigned to committees. As a result, a good deal of time and effort goes into reconciliation of the estimates to be forwarded as the official government statistics.

The uneven development of product statistics in the countries surveyed is attributable to a number of causes which cannot be left out of account or ignored. First in importance in a number of countries is the state of development of the "processing" phase or "products" section of the fishery industries. Where the "processing" of fish is carried on by fishermen and their families, the collection of statistics on product output usually presents considerable difficulty. However, if the structure of the industry provides some type of organization for these small enterprises, such as centralization of marketing, or legal requirements related to marketing, difficulties in obtaining statistics on products may not be important. At least a receipt or a statement of returns is given to fishermen and the marketing channel or agency will most likely maintain accounting records. The advantages of large processing units, such as canning factories, is quite apparent and is shown in the rather common availability of statistics on canned products for most countries.

Yet, in some countries where the structure of the processing industry is so ordered that satisfactory product statistics might be expected, the results obtained fall far short of expectations! The cause of this short fall in results seems to be related to social and business attitudes. There is a reluctance of the businessman, the "entrepreneur", to disclose information about the business and a corresponding reluctance on the part of government officials to press for the information. In part this may reflect a traditional independence associated with fisheries and in part in some countries the lag in application to the fisheries of many of the modern business developments, including the use of general statistics in day-to-day management and longer term planning for the individual businesses.

A third cause, but one perhaps of diminishing importance, lies in the position of "fishery" statistics in national government organizations and the attitudes toward this work. To a considerable extent fishery statistics have been carried on as an activity in governments more or less independent of general or central statistical services. The primary interest has been in statistics of the raw material, the fish itself, with less interest being shown in fishery products or in the fish processing industry as distinct from the fish catching operation. While it was noted that this cause seems to be diminishing in importance, nevertheless, both nationally and internationally, statistics of the fisheries lag in coverage and reliability behind those of several other industries.

The burden of reporting to international agencies has been discussed in the foregoing in relation to catch or landing statistics and an accounting of the raw material by forms of product. While not specifically referred to, the comments on the burdens involved in catch or landing statistics are intended to apply to the information required along with data on the weight or numbers of fish landed. The heaviest burden arises out of both national and international requirements for information on details which can be obtained only by collection of information on each separate fishing endeavour. Information and data of this kind are the source of problems throughout each country's fisheries statistical system. The problems begin with the difficulty of getting fishermen to maintain records; they continue through the work of collecting the records, and seem to be no less numerous or intense in the compilation process. The editing of these records before compilation takes a considerable time in many countries and much judgement is required in interpretation of the information.

The problems and difficulties attributable to lack of clarity in concepts, definitions and terminology were raised by only a few of the officials in countries visited. Nevertheless, it is apparent that there is considerable variation in the interpretation of requirements of international agencies on the part of officers of national governments. Some demonstration of the problem is evident from the not infrequent issue of instructions to participating governments. A considerable part of the problem is obscured in the statistical series carried in publications of the international agencies.

Where specifications are inadequate or lacking in certain statistical series, national governments are tempted to supply statistics unsuitable for the purposes originally intended. Further, there is likely to be less stimulation to improve national statistics in order to meet international requirements and standards.

In particular, the lack of or haziness in definitions in statistical series on catches and/or landings, in product statistics, and in the information required on fishermen, boats and gear presents problems to national statistical offices. A proportion of these problems arises out of the requirements for detailed data on the fishing operations, especially in catch/effort statistics. In reporting statistics for vessels and gear some countries experience difficulty and spend considerable effort in matching their data to international classifications.

In presenting the problems relating to the timing and timeliness of statistics, difficulties encountered by governments may be classified in two ways. First, there is the requirement that statistics for a period be submitted by a given date. In order to meet this deadline, the work load of a government statistical office becomes disproportionately heavy for relatively short periods of the year. This burden is more severe in the case of statistical series collected only once annually, usually at or near a year end. Nearly all countries have a problem in completing all international agency fisheries schedules or questionnaires within the three or four months following the year end. This is simply a reflection of the nature of certain of the series required; they come mainly from once-a-year collection and compilation programs.

The second category of problems or difficulties arising out of timing includes those associated with the segmentation of the periods required in statistical reporting. The breaking of the statistics for a year's fishing activities into twelve monthly series, with subsorts according to species, gear, water area, and so forth, taxes the statistical resources of several countries. Sometimes, this burden appears in a year and/or early following year carry-over of work and this tends to become chronic. Officials cannot meet deadlines and there may be undesirable effects which eventually undermine the statistical program.

B. ISSUES AND RECOMMENDATIONS

From all the foregoing, including the general discussion of requirements and problems arising therefrom, it is apparent that national governments themselves must come to grips with the issues.

The foremost issue revolves around the matter of establishing a realistic list of international requirements which can be met by member governments now or in the not-too-distant future. The term "realistic" is used here in several senses. First, these must be statistics or data which can be collected and compiled without too much difficulty by the individual countries. Secondly, they should stand a test of meaningfulness, usefulness and reliability in application in research, in administration and by the fisheries industry itself. The examination of the requirements should include a thorough and critical review of the uses of fishery statistics including the hypotheses and theories which are now accepted in justification of some of the more exacting demands falling on member governments.

The next issue is the matter of follow-up within member countries of reorganizing and developing national fishery statistical systems to yield the data in the form and timeliness required. Unless national governments are prepared to undertake these tasks, there will not be improvement and progress in international fishery statistics.

In referring to the establishment of a list of statistical requirements, it is assumed that concomitantly there would be an accompanying list of concepts, terminology and definitions. Likewise, there would be specifications concerning timing and timeliness. Further, recognizing the varying states and stages of development of fishery statistics, the listing would include an indication of the degree of priority attached to each series.

Unless the issues referred to above are resolved, there does not appear to be much hope of substantial progress in national fishery statistical development without which there cannot be the desired improvement in international fishery statistics. The task of working through the issues must proceed systematically with careful preparation and equally careful balancing of the considerations in order that decisions may be taken which will stand the test of time.

The review of national systems of fishery statistics leads to the conclusion that some substantial part of difficulties, both national and international, results from the lack of a plan, a scheme for a national system. As they now stand, the national systems are collections of individual series of statistics with many of these series having been developed without relating them to already existing series. They have been instituted for special purposes or represent by-products of administrative research and other activities. Some of these series have to be accepted as substitutes for the conceptually acceptable statistics. However, this acceptance should be accorded only when deviations from the agreed concepts are recognized and acknowledged.

As a series of steps to improve the situation, it is recommended that:

(a) A meeting or series of meetings be arranged of representatives of national governments and the international agencies concerned to:

(i) Consider international requirements for fishery statistics;

(ii) Restate these requirements with appropriate description of concepts and statements of definition in relation to the terminology employed in fishery statistics.

(b) National governments prior to meeting, review the requirements they have agreed to meet in regard to supply of fisheries statistics to international organizations.

(c) National governments following the meeting:

(i) Review their national programs to determine what changes will be necessary to meet international requirements, as well as their own needs;

(ii) Establish a program for improvement of their national systems having regard for the need of an integrated system of fishery statistics, and the coordination of this with the general national statistical system.

(d) Prior to, if at all possible, and certainly immediately following the meeting, an international agency provides a person or persons on its staff to:

(i) Act in a consultant capacity to national governments in the development of national programs for reorganization and improvement of fishery statistics.

(ii) Undertake liaison between the international agencies on matters of fishery statistics;

(iii) Prepare documentation for the purpose of assisting national governments in their programs in (i) above.

C. SOME OBSERVATIONS AND CONCLUSIONS

The recommendations in the latter part of the preceding section were purposely expressed in general terms so that the broad principles might be examined on their merits. In this section, the authors submit some views of their own and expand upon the detail of the recommendations.

The proposed meeting is regarded as a most important part of the program for improvement of fishery statistics. Because of this, it will require adequate planning and preparation. There should be sufficient time during the meeting for adequate deliberation and preparation of reports. Elements to be taken into consideration in planning the meeting and suggestions on organization and procedure are:

(a) National Representation - Essentially this meeting should be at the "working level". Competent fisheries statisticians should be in attendance. In addition, there should be representation of the users, i.e. especially research workers in biology and economics, as well as officers requiring statistics in administering national fisheries program.

(b) Documentation - Prior to the meeting there should be adequate preparation of documentation by experts in the subject matter fields. Documents should be circulated to governments beforehand with sufficient time for their consideration by all concerned in each country;

(c) Organization and Procedure - The meeting should break into working groups for the discussion of each subject. Each group should be responsible for bringing an agreed report to the main meeting for acceptance;

(d) Subjects for discussion - This meeting should not be regarded as the only one to be held on the subject of fishery statistics, but rather the beginning one of a series to tackle the outstanding problems. On this understanding, the initial meeting should be restricted to the most bothersome problems. It is suggested these fall into subject matter fields as follows:

(i) Catch and/or Landing Statistics

This would include the subject of "biological" and "fishing operation" information with particular reference to uses and usefulness and to the ability of countries to provide reliable data. There should be clarification of concepts and definitions and a thorough review of timing and timeliness of fishery statistics. Difficulties relating to international identification of species should receive attention and the problem of conversion factors should be considered.

(ii) Product Statistics

This subject warrants an important place in the meeting program because of the difficulties of many countries in the annual exercise of providing "disposition" statistics. The usefulness of "disposition" data should be reviewed in terms of reliability and meaning in relation to stages of development of product statistics in member countries.

(iii) Fishermen, Fishing Vessels and Gear

If the statistics on these matters are to be additive internationally and to be more than simply interesting, it will be necessary to set down requirements in a more precise form. Particularly needful are systems of classification of vessels and gear so devised as to reduce difficulties of individual governments in fitting their statistics into international requirements and at the same time providing direction to governments wishing to change their classification systems.

While recognizing that national governments alone are responsible for their own housekeeping, it is, nevertheless, a fact that improvements in statistical methods and procedures have been spurred by exchange of ideas at meetings and through visits of the "working" statisticians. Some countries have developed particular techniques and methods, in many instances quite simple and perhaps of ready application elsewhere to their own problems of compilation, maintenance and records, and so forth. These might be demonstrated and discussed at a meeting. Further, there are new developments in electronic compilation which are under experiment in some countries and might be useful and helpful to explore these developments and experiments, from both the interests of governments and of international agencies.

In elaboration of the above proposals, reference is made again to the recommendation for appointment of a staff member to an international agency. It would be considered that he would provide guidance and help in compilation problems and keep abreast of developments. In the course of moving from country to country, he would accumulate valuable information on data processing which he could make available to the benefit of all concerned.

D. CERTAIN PERSONAL COMMENTS, SUGGESTIONS AND VIEWS OF THE AUTHORS

In order to provide a starting point for discussion of some of the matters raised in this report, the authors considered it might be helpful to put forward some of their own comments and suggestions, particularly with reference to the development of terminology and definitions. Recognizing the intricacy of the subject matter field, this is done with a considerable hesitancy and humbleness, the latter arising out of several years of close association with the fishery statistical system of their own country, not to mention their more recent tempering experience in visiting the countries included in this survey. Nevertheless, the observations to follow are recorded on an understanding that they will be taken as of a tentative nature, subject to such amendment and modification as may be deemed advisable by all concerned.

Catch

It is suggested that this term should apply to the estimated weight of the round fish as taken from the water and retained on board the boat or vessel. It should not include fish discarded immediately when the haul is taken aboard. This measure of catch, as a general rule, should be a relatively close estimate of the true measure because it would be based upon capacity of the hold or fish storing space on fishing vessels. It should be stated in terms of round fish because changes in form usually follow haulage of the catch on board.

Landings

Landings should represent the weight or count of fish at the first unloading on shore. These quantities should be stated in terms of the form in which landed. The difference between catch and landings, therefore, would be represented in the following disposal items: (a) any discards of fish at sea subsequent to the hauling in of the catch. This would include spoiled fish, further culling of undesirable species, and so forth; (b) discard of heads, viscera, and so forth, as a result of changes in form made subsequent to the catch; (c) that part of the catch utilized on board ship as food and consumed by the crew of the vessel.

There may be instances where a part of the catch is sold at sea for utilization on other vessels. This method of disposal would be treated as a shore landing of fish.

The survey has disclosed that from country to country there are now considerable differences in the kinds of figures supplied as "landings". In some instances these figures represent sales by fishermen through certain specified outlets only, such as, for example, fish markets or fish auctions and there may be considerable omission of direct sales to consumers and direct use of the product by fishermen themselves.

Products

As suggested previously, the major gaps and the most difficult area of statistical operations in a large number of countries lie in product and industry statistics relating to the fisheries. There has been no clear differentiation established as to the objectives stated in terms of definitions of requirements. The so-called disposition or utilization statistics in many countries are arrived at by derivation and as a last resort by questionable methods of estimation.

The major problem in product statistics is the difficulty of predetermining the ultimate or end form. For this reason a statement of disposition at any given point of time involves assumption about the utilization of raw and semi-processed materials at stages other than the final end product. While doubtless, the disposition or utilization tables have some value in a historical determination of trends, it is considered that the emphasis should be shifted to the provision of adequate product statistics to reflect the output periodically at recognized stages in the production process. It is suggested that the product statistics might be requested in the following broad categories:

Fresh Fish -
Round and Fillets;

Frozen Fish -
Round and Fillets;

Cured Fish -
Smoked, Salted, Chemically and Biologically Treated;

Canned Fish.

Fish Processing Industries Statistics

Generally, the problem here is one of recognizing the difficulties inherent in an industry versus a product or commodity approach. These difficulties vary in intensity from country to country, but are likely to grow, rather than diminish, as some fish processing industries diversify processing operations to include mixtures of fish products, as well as products other than those of fisheries origin. A definition should be devised and accepted from country to country in regard to the plants and industries to be included within the fish processing category.

Fishermen

The statistics being compiled on numbers of fishermen by national governments comprise a range of notions relating to the personnel employed in fishing activity. In some countries attempts are made to classify persons engaged in fishing according to their dependence upon the industry for their livelihood. This classification may be determined by the proportion of their employable time devoted to fishing or upon the proportion of the livelihood derived from the activity. Within the occupation some countries have fairly precise statistics describing the nature of the duties such as skipper, fishing crew member, engineer, and so forth, but there is no consistency throughout and comparisons between countries have little meaning.

From the national interest there is going to be a demand for a classification of fishermen required to satisfy the particular needs and conditions of each country. Having regard to this and to the difficulty of establishing international standards suitable for each country because of social and economic differences, such as for example, in wage rates and wage levels, and in scales of living, a satisfactory solution might be found in the establishment of broad groupings according to dependence on the fishery. Individual countries could then set up more precise definitions in their own terms for sub-classes or groups.

Fishing Vessels and Fishing Boats

In many respects the problems of definition here resemble those just discussed relating to fishermen. The problems in respect to classification for vessels of the high sea fisheries have been tackled in the statistical work of ICNAF and considerable progress has been achieved. However, it is much more difficult to obtain suitable classifications and definitions for small fishing boats because these are mainly the products of local indigenous small boatbuilding industries where individual craftsmanship leads to much adaptation to meet local conditions. It is much more difficult, for example, to classify these boats according to type of gear most frequently used or according to the kinds of fish taken than is the case with high seas vessels. However, even for those vessels there is considerable conflict between use or purpose classifications, and type of fishing classifications.

There is room indeed, for a good deal of work here and some progress on the technical side is already evident from international meetings on fishing boat design. It might be useful to suggest here that the technical fishing boat personnel should concentrate upon the production of a classification system for all vessels and boats in the fisheries which could be adapted for international use.

Generally, there is little information on the capital stock and investment in the primary fisheries. It is suggested that attention might be directed to establishment of a uniform basis for boat and vessel valuation with a view to providing an annual statement of the capital stock existing in this form. This same comment might be applied to fishing gear statistics discussed in a following section.

On the subject of fishing boats and vessels, consideration should be given to the specifications of the statistical series required on these items. At present, it would appear that the boat and vessel statistics mainly represent rough measures of input in the sense that for most countries, a vessel having engaged in fishing at any time during the year appears in the count. However, this is not an appropriate procedure if the series is intended to represent the capital stock of the fishery at a given point of time.

Fishing Gear

The latter comments on boat and vessel statistics provide a starting point for discussion of the need for clarification of concepts and definitions in regard to gear reporting. Only very few countries collect gear statistics and in these it is not clear as to whether the data represent inputs, capital stock or, in fact, a combination of both. While the present survey did not include a detailed study of fishing gear statistics, it is suggested that along with the boat and vessel statistics the natural

association of gear statistics more or less automatically justifies attention to these items. This is particularly the case because of developments in recent years in which other fishing accoutrement associated with gear has become a major capital stock item in many fisheries. This has particular reference to electronic equipment and devices applied to fishing.

No doubt the tenor of this report will appear to some to be perhaps over-critical, to some to be pessimistic, and to others to be deprecating of the efforts of national and international workers in fishery statistics. The authors refer again to the terms of reference and objectives of this survey and study. The undertaking grew out of the concern of member governments over the burden they have imposed upon themselves by the build-up process of setting international requirements for fishery statistics. It also grew out of rising doubts about the reliability, and even the usefulness, of certain statistical series, especially when these represented additions or combinations of various national series. And even further, questions were being raised about differences in statistical series on the same subjects appearing in official publications of several international agencies. Hence, the authors and investigators had to concentrate on the problem aspects and direct their whole effort and the main body of this report to these matters.

As a result, the report to this point conveyes a distorted perspective of the national and international situation in fishery statistics. Moreover, this distortion cannot be corrected fully, for to do so would require an expression of the keeness, of the devotion to and interest in fishery statistics shown by the majority of the officials, both national and international, who are engaged in this work. The qualities ascribed above to these officials cannot be either adequately or appropriately expressed on paper; the sense of these qualities and their import for the future of fishery statistics can be obtained only through personal relationships. Because of this, the proposed meeting or meetings as an essential part of the statistical improvement program should be given a high order of priority indeed.

The report also may convey the impression that in many countries and in international agencies, the situation in fishery statistics is static; that no substantial progress has been made in recent years. This impression, if gained from the report, is by all means a false one. There have been great improvements in many directions even in the relatively short period following the resumption of near-normal national government activities in the immediate post-war period. Some of these improvements have been the result of direct and indirect influences and help given by central statistical offices in several of the countries. Perhaps statistics of the fish processing industry and fisheries products have been most affected in this way. And in this connection, some measure of credit must be attributed to the work of the Central Statistical Office of the United Nations. Despite remarks elsewhere in this report which may be taken in a contrary connotation, there have been improvements in statistics of the primary industry, including data on catches and landings. The Food and Agriculture Organization of the United Nations, the International Commission for the Northwest Atlantic Fisheries and the International Council for the Exploration of the Sea have all contributed in varying ways, but in substantial measure, according to their interests in particular aspects of the primary fisheries and the industries based upon or related to them.

The authors reiterate, perhaps at the risk of over-emphasis of their opinions, that the major longer-run task is the development of an integrated statistical system, integrated within the fishery industry and with fishery statistics integrated in a national statistical program. The authors recognize the magnitude and complexities of the task, particularly in view of the diversity of interests in fishery statistics, but are confident that solutions to the probelms and to the difficulties are both feasible and possible.

ANNEX F

FAO INTERNATIONAL STANDARD STATISTICAL CLASSIFICATION OF AQUATIC ANIMALS AND PLANTS (FISSCAAP)

DIVISION, group	
1	FISHES
11	Freshwater fishes
12	Salmons, trouts, smelts, etc.
13	Flounders, halibuts, soles, etc.
14	Cods, hakes, haddocks, etc.
15	Herrings, sardines, anchovies, etc.
16	Tunas, bonitos, mackerels, etc.
17	Mullets, jacks, sea-basses, etc.
18	Sharks, rays, etc.
19	Unsorted and unidentified fishes
2	CRUSTACEANS, MOLLUSCS AND OTHER INVERTEBRATES
21	Crustaceans
22	Molluscs
23	Bêche-de-mer, sea-urchins, ascidians, etc.
3	WHALES
31	Blue-whales, fin-whales, sperm-whales, etc.
32	Minke-whales, pilot-whales, etc.
4	SEALS AND MISCELLANEOUS AQUATIC MAMMALS
41	Porpoises, dolphins, etc.
42	Eared seals, hair-seals, walruses, etc.
43	Miscellaneous aquatic mammals
5	MISCELLANEOUS AQUATIC ANIMALS AND RESIDUES
51	Turtles, frogs, etc.
52	Pearls, shells, sponges, corals, etc.
6	AQUATIC PLANTS
61	Aquatic plants

NOTE: The FISSCAAP consists of 20 "groups" (two-digit numbering, underscored) arranged within six "DIVISIONS" (single-digit numbering, capitals).

ANNEX G

FAO INTERNATIONAL STANDARD STATISTICAL CLASSIFICATION
OF FISHERY COMMODITIES (FISSCFC)

DIVISION, group

1 FISH, CRUSTACEANS, AND MOLLUSCS, FRESH, FROZEN, DRIED, SALTED OR SMOKED

- 11 Fish, fresh, chilled or frozen
- 12 Fish, dried, salted or smoked
- 13 Crustaceans and molluscs, fresh, frozen, dried salted, etc.

2 FISH, CRUSTACEAN AND MOLLUSC PRODUCTS AND PREPARATIONS, WHETHER OR NOT IN AIRTIGHT CONTAINERS

- 21 Fish products and preparations, whether or not in airtight containers
- 22 Crustacean and mollusc products and preparations, whether or not in airtight containers

3 OILS, FATS, WAXES, ETC., OF AQUATIC ANIMAL ORIGIN

- 31 Oils and fats, crude or refined
- 32 Oils and fats, processed
- 33 Waxes, crude, pressed or refined

4 ANIMAL FEEDINGSTUFFS AND FERTILIZERS OF AQUATIC ANIMAL ORIGIN

- 41 Meals, solubles and similar animal feedingstuffs
- 42 Bone meals, shell grit and similar animal feedingstuffs
- 43 Pet foods, hatchery feeds, and similar products
- 44 Fertilizers and similar products

(continued)

ANNEX G (concluded)

DIVISION, group

5 MISCELLANEOUS PRODUCTS OF AQUATIC ANIMAL ORIGIN

- 51 Fish, crustacean and mollusc sauces and soups, whether or not in airtight containers
- 52 Miscellaneous edible products
- 53 Inedible fish ova, wastes, offal, etc.
- 54 Fish and shark skins
- 55 Aquatic mammal fur skins, hides and other skins
- 56 Bones, shells, etc., unworked or simply prepared
- 57 Sponges, raw or prepared
- 58 Pearls, not set or strung
- 59 Miscellaneous inedible products

6 PRODUCTS OF AQUATIC PLANT ORIGIN

- 61 Chemical materials and products
- 62 Edible products for human food
- 63 Animal feedingstuffs
- 64 Fertilizers
- 65 Miscellaneous products

NOTE: The FISSCFC consists of 26 "groups" (two-digit numbering, underscored) arranged within six "DIVISIONS" (single-digit numbering, capitals).

ANNEX H

FAO INTERNATIONAL STANDARD STATISTICAL CLASSIFICATION
OF FISHERY COMMODITIES (FISSCFC) - DETAILED VERSION

DIVISION, group, sub-group

1 FISH, CRUSTACEANS, AND MOLLUSCS, FRESH, FROZEN, DRIED, SALTED OR SMOKED

11 Fish, fresh, chilled or frozen

111 Fish fillets, fresh or chilled
112 Herring, fresh or chilled
113 Miscellaneous fish products, fresh or chilled
114 Fish fillets, frozen
115 Herring, frozen
116 Miscellaneous fish products, frozen

12 Fish, dried, salted or smoked

121 Stockfish (cod and similar species, dried, unsalted)
122 Cods, hakes, haddocks, etc., salted
123 Herring, dried or salted
124 Sardines, anchovies, etc., dried or salted
125 Miscellaneous fish products, dried or salted
126 Herring, smoked or smoked-frozen
127 Miscellaneous fish products, smoked or smoked-frozen

13 Crustaceans and molluscs, fresh, frozen, dried, salted, etc.

131 Crustaceans, fresh, frozen, dried, salted, etc. 1/
132 Molluscs, fresh, frozen, dried , salted, etc. 2/

2 FISH, CRUSTACEAN AND MOLLUSC PRODUCTS AND PREPARATIONS, WHETHER OR NOT IN AIRTIGHT CONTAINERS 3/

21 Fish products and preparations, whether or not in airtight containers

211 Pacific salmons, in airtight containers
212 Herrings, sardines, anchovies, etc., in airtight containers
213 Tunas, bonitos, mackerels, etc., in airtight containers
214 Miscellaneous fish products, in airtight containers 4/
215 Fish preparations, not in airtight containers 4/

(continued)

ANNEX H (continued)

DIVISION, group, sub-group

2 (concluded)

22 Crustacean and mollusc products and preparations, whether or not in airtight containers

221 Crustacean products, in airtight containers
222 Mollusc products, in airtight containers
223 Crustacean preparations, not in airtight containers 1/
224 Mollusc preparations, not in airtight containers 2/

3 OILS, FATS, WAXES, ETC., OF AQUATIC ANIMAL ORIGIN

31 Oils and fats, crude or refined

311 Whale oil
312 Sperm oil
313 Whale liver oil
314 Fish liver oils and similar products
315 Fish body oils and similar products
316 Miscellaneous oils and fats

32 Oils and fats, processed

321 Oxydized, blown, boiled, thickened, polymerized or sulphuretted oils
322 Hydrogenated oils
323 Fatty acids and solid residues

33 Waxes, crude, pressed or refined

331 Spermaceti and other waxes

4 ANIMAL FEEDINGSTUFFS AND FERTILIZERS OF AQUATIC ANIMAL ORIGIN

41 Meals, solubles and similar animal feedingstuffs

411 Meat meals, liver meals and solubles from whales
412 Fish meals from "white fish" ("ground fish")
413 Fish meals and solubles from oily fish
414 Miscellaneous meat meals and solubles

42 Bone meals, shell grit and similar animal feedingstuffs

421 Bone meals from whales
422 Miscellaneous bone meals
423 Shell grit and similar animal feedingstuffs

(continued)

ANNEX H (continued)

DIVISION, group, sub-group

4 (concluded)

43 Pet foods, hatchery feeds, and similar products

431 Pet foods whether or not in airtight containers
432 Hatchery feeds and similar products

44 Fertilizers and similar products

441 Fertilizers from whales
442 Aquatic bird guano
443 Miscellaneous fertilizers

5 MISCELLANEOUS PRODUCTS OF AQUATIC ANIMAL ORIGIN

51 Fish, crustacean and mollusc sauces and soups, whether or not in airtight containers

511 Fish, crustacean and mollusc sauces
512 Fish, crustacean and mollusc soups

52 Miscellaneous edible products

521 Live aquatic animals, chiefly for human food
522 Meat, fresh, chilled or frozen
523 Meat, dried, salted or smoked
524 Meat extracts, whether or not in airtight containers
525 Sausages, whether or not in airtight containers
526 Meat products and preparations, whether or not in airtight containers

53 Inedible fish ova, wastes, offal, etc.

531 Fish ova for hatching
532 Fish eggs and roes for bait, fresh
533 Fish eggs and roes for bait, dried or salted
534 Fish eggs and roes for bait, in airtight containers
535 Fish, crustaceans and molluscs, whole or part, for bait
536 Fish sounds, maws, bladders, etc.
537 Fish guts, heads, skin wastes, and other offal
538 Fish scales

54 Fish and shark skins

541 Fish skins and shark skins, crude or undressed

55 Aquatic mammal fur skins, hides and other skins

551 Hides and skins, undressed
552 Fur skins, undressed

(continued)

ANNEX H (concluded)

DIVISION, group, sub-group

5 (concluded)

56 Bones, shells, etc., unworked or simply prepared

561 Bones of aquatic mammals
562 Whalebone and whalebone hair
563 Ivories (tusks) of aquatic mammals
564 Tortoise-shell and tortoise-shell scales
565 Corals
566 Mother-of-pearl and other shells

57 Sponges, raw or prepared

571 Natural sponges and sponge wastes

58 Pearls, not set or strung

581 Pearls, natural or cultured

59 Miscellaneous inedible products

591 Ambergris
592 Dyeing extracts and colouring matters
593 Fish glues
594 Isinglass

6 PRODUCTS OF AQUATIC PLANT ORIGIN

61 Chemical materials and products

62 Edible products for human food

63 Animal feedingstuffs

64 Fertilizers

65 Miscellaneous products

NOTE: The FISSCFC consists of 26 "groups" (two-digit numbering, underscored) arranged within six "DIVISIONS" (single-digit numbering, capitals). The 26 "groups" are subdivided into approximately 80 "sub-groups" (three-digit numbering, lower case, not underscored).

1/ Crustaceans in the shell simply boiled in water included in sub-group 131; all other cooked crustaceans in sub-group 223.
2/ Sub-group 224 includes all cooked molluscs.
3/ Fish, crustacean and mollusc sauces and soups, whether or not in airtight containers, included in group 51.
4/ Prepared or preserved fish, including caviar and caviar substitutes.

ANNEX I

RELATIONSHIP AMONG FISSCFC, BTN, SITC REVISED AND SITC ORIGINAL

FISSCFC		BTN		SITC REVISED		SITC ORIGINAL	
DIVISION	1	Chapter	3	Group	*031*		...
Group	11	Heading	*03.01*	Sub-group	*031.1*	Item	*031-01*
Sub-group	111	Sub-heading	*03.01*(A)	Item	*031.1(1)*		...
Sub-group	112	Sub-heading	*03.01*(B)	Item	*031.1(2)*		...
Sub-group	113	Sub-heading	*03.01*(C)	Item	*031.1(3)*		...
Sub-group	114	Sub-heading	*03.01*(D)	Item	*031.1(4)*		...
Sub-group	115	Sub-heading	*03.01*(E)	Item	*031.1(5)*		...
Sub-group	116	Sub-heading	*03.01*(F)	Item	*031.1(6)*		...
Group	12	Heading	*03.02*	Sub-group	*031.2*	Item	*031-02*
Sub-group	121	Sub-heading	*03.02*(A)	Item	*031.2(1)*		...
Sub-group	122	Sub-heading	*03.02*(B)	Item	*031.2(2)*		...
Sub-group	123	Sub-heading	*03.02*(C)	Item	*031.2(3)*		...
Sub-group	124	Sub-heading	*03.02*(D)	Item	*031.2(4)*		...
Sub-group	125	Sub-heading	*03.02*(E)	Item	*031.2(5)*		...
Sub-group	126	Sub-heading	*03.02*(F)	Item	*031.2(6)*		...
Sub-group	127	Sub-heading	*03.02*(G)	Item	*031.2(7)*		...
Group	13	Heading	*03.03*	Sub-group	*031.3*	Item	*031-03*
Sub-group	131		...		...		...
Sub-group	132		...		...		...

(Continued)

ANNEX I (continued)

FISSCFC		BTN		SITC REVISED		SITC ORIGINAL
DIVISION	2	Chapter	16	Sub-group	*032.0*	...
Group	21	Heading	*16.04*	Item	*032.0(1)*	Item 032-01 Item 032-02
Sub-group	211		...		...	...
Sub-group	212		...		...	...
Sub-group	213		...		...	...
Sub-group	214		...		...	...
Sub-group	215		...		...	...
Group	22	Heading	*16.05*	Item	*032.0(2)*	Item 032-01 Item 031-02
Sub-group	221		...		...	...
Sub-group	222		...		....	...
Sub-group	223		...		...	...
Sub-group	224		...		...	...
DIVISION	3	Chapter	15	Section	4	...
Group	31	Heading	*15.04*	Sub-group	*411.1*	Item *411-01*
Sub-group Sub-group	311 312	Sub-heading	*15.04*(B)	Item	*411.1(2)*	...
Sub-group Sub-group	313 314	Sub-heading	*15.04*(A)	Item	*411.1(1)*	...
Sub-group Sub-group	315 316	Sub-heading	*15.04*(C)	Item	*411.1(3)*	...
Group	32					
Sub-group	321	Heading	15.08	Sub-group	431.1	Item 413-01
Sub-group	322	Heading	15.12	Sub-group	431.2	Item 413-02
Sub-group	323		...	Sub-group	431.3	Item 413-03

(Continued)

ANNEX I (continued)

FISSCFC		BTN		SITC REVISED		SITC ORIGINAL	
Group	33	Heading	*15.14*		...		...
Sub-group	331		...	Item	431.4(1)	Item	413-04
DIVISION	4	Chapters	5 23 31	Divisions	08 27 29		...
Group	41	Sub-heading	*23.013*	Item	*081.4(2)*		...
Sub-group	411		...		...		...
Sub-group	412		...		...		...
Sub-group	413		...		...		...
Sub-group	414		...		...		...
Group	42	Chapter	5	Group	291		...
Sub-group	421	Heading	05.08	Item	291.1(1)	Item	291-01
Sub-group	422	Heading	05.08	Item	291.1(1)	Item	291-01
Sub-group	423	Heading	05.12	Item	291.1(5)	Item	291-01
Group	43	Chapter	23		...		...
Sub-group	431	Heading	23.07	Item	081.9(9)	Item	081-09
Sub-group	432	Heading	23.07	Item	081.9(9)	Item	081-09
Group	44	Chapter	31	Group	271		...
Sub-group	441	Heading	31.01	Item	271.1	Item	271-01
Sub-group	442	Heading	31.01	Item	271.1	Item	271-01
Sub-group	443	Heading	31.01	Item	271.1	Item	271-01
DIVISION	5		...		...		...
Group	51	Chapter	21	Group	099		...
Sub-group	511	Heading	21.04	Item	099.0(4)	Item	032-01
Sub-group	512	Heading	21.05	Item	099.0(5)	Item	032-02

(Continued)

ANNEX I (continued)

FISSCFC	BTN	SITC REVISED	SITC ORIGINAL
Group 52	...	...	...
Sub-group 521	Sub-heading 01.06(A)	Sub-group 001.9	Item 001-09
Sub-group 522	Heading 02.04	Item 011.8(9)	Item 011-09
Sub-group 523	Sub-heading 02.06(B)	Sub-group 012.9	Item 012-03
Sub-group 524	Heading 16.03	Sub-group 013.3	Item 013-09
Sub-group 525	Heading 16.01	Sub-group 013.4	Item 013-01
Sub-group 526	Heading 16.02	Sub-group 013.8	Item 013-2
Group 53	Chapter 5	Group 291	...
Sub-group 531	Heading 05.15	Sub-group 291.9(9)	Item 291-09
Sub-group 532	Heading 05.15	Sub-group 291.9(9)	Item 291-09
Sub-group 533	Heading 05.15	Sub-group 291.9(9)	Item 291-09
Sub-group 534	Heading 05.15	Sub-group 291.9(9)	Item 291-09
Sub-group 535	Heading 05.05	Sub-group 291.9(4)	Item 291-09
Sub-group 536	Heading 05.05	Sub-group 291.9(4)	Item 291-09
Sub-group 537	Heading 05.05	Sub-group 291.9(4)	Item 291-09
Sub-group 538	Heading 05.05	...	...
Group 54	Chapter 41	Division 21	...
Sub-group 541	Sub-heading 41.01(F)	Sub-group 211.9	Item 211-09
Group 55	Chapters { 41 43	...	...
Sub-group 551	Sub-heading 41.01(F)	Sub-group 211.9	Item 211-09
Sub-group 552	Heading 43.01	Sub-group 212.0	Item 212-01

(Continued)

ANNEX I (continued)

FISSCFC		BTN		SITC REVISED		SITC ORIGINAL	
Group	56	Chapter	5	Sub-group	291.1		...
Sub-group	561	Sub-heading	05.08	Item	291.1(1)	Item	291-01
Sub-group	562	Sub-heading	05.09(2)	Item	291.1(2)	Item	291-01
Sub-group	563	Sub-heading	05.10	Item	291.1(3)	Item	291-01
Sub-group	564	Sub-heading	*05.11*	Item	291.1(4)	Item	291-01
Sub-group Sub-group	565 566	Sub-heading	*05.12*	Item	*291.1(5)*	Item	291-01
Group	57	Chapter	5		...		...
Sub-group	571	Heading	*05.13*	Item	*291.9(7)*	Item	291-09
Group	58	Chapter	71		...		...
Sub-group	581	Heading	*71.01*	Sub-group	*667.1*	Item Item	672-03 672-04
Group	59	Chapters	5 32 35	Divisions	29 53 59		...
Sub-group	591	Heading	05.04	Item	291.9(8)	Item	291-09
Sub-group	592	Heading	32.04	Sub-group	532.1	Item	532-01
Sub-group	593	Sub-heading	*35.03*(B2)	Item	599.5(5)	Item	599-04
Sub-group	594	Sub-heading	35.03(C)				
DIVISION	6						
Group	61		...		...		...
Group	62	Heading	23.06	Item	081.1(9)	Item	081-01
Group	63	Heading	31.01	Sub-group	271.1	Item	271-01
Group	64		...		...		...
Group	65		...		...		...

(Continued)

ANNEX I (concluded)

SOURCE: FISSCFC - FAO International Standard Statistical Classification of Fishery Commodities - Detailed version (see Annex H).

BTN - Customs Co-operation Council, Nomenclature for the Classification of Goods in Customs Tariffs, 1955, and Explanatory Notes to the Brussels Nomenclature, 1955, Volumes I, II, and III.

SITC, REVISED - Standard International Trade Classification, Revised, Statistical Papers, Series M, No. 34, United Nations, 1961.

SITC, ORIGINAL - Commodity Indexes for the Standard International Trade Classification, Statistical Papers, Series M, No. 10, United Nations, 1953.

NOTE: BTN, SITC-Revised and SITC-Original entries in *italics* in the second, third and fourth columns respectively have a coverage identical with the corresponding FISSCFC entry in the first column. Other entries not in italics in these three columns generally include also non-fishery commodities in addition to those included in the corresponding FISSCFC entries.

ANNEX J

CONTINUING WORKING PARTY ON FISHERY STATISTICS IN THE NORTH ATLANTIC AREA 1/
Report on the First Session
Bergen, Norway; 25-26 May 1960

REPORT

1. The Working Party met on 25 May 1960 at 10.30 a.m. in Bergen, Norway, at the Marine Institute Building. All members were present: Mr. W.C. MacKenzie (Canada), Mr. M. Elísson (Iceland), Dr. O. Bauer (Federal Republic of Germany), Mr. F. Allen (United Kingdom), Mr. R.S. Keir (ICNAF), Dr. A. Fridriksson (ICES), and Mr. F.E. Popper (FAO).

2. Mr. E. Tamburi (FAO) opened the meeting in his capacity of Acting Secretary of the Working Party, and invited the participants to comment on the Draft Agenda (STANA/I/1), which had been submitted to them for approval. It was suggested and agreed that item 6 should be made item 5 and item 5 would become item 6; the following agenda was then adopted without other changes:

GENERAL MATTERS

1. Adoption of Agenda;
2. Election of Officers;
3. Adoption of Statute and Rules of Procedure;
4. Nomination of additional members of the Working Party;

TECHNICAL MATTERS

5. Standardization of terminology for fishing areas in statistical reporting;
6. Standardization of statistical reporting betwen ICES, ICNAF and FAO;
7. Progress report on preparation of fully documented edition of the Report (ESTANA/8 - Revised) of the Edinburgh Meeting;
8. Other matters;
9. Date and place of next meeting.

3. On item 2 of the Agenda, Election of Officers, Mr. R.S. Keir was unanimously elected Chairman of the Working Party. He took the chair and asked for the nomination of a Vice-Chairman; Mr. M. Elísson was then unanimously elected.

1/ Reproduced as STANA/I/5 (Revised)

4. On item 3 of the Agenda, Adoption of Statute and Rules of Procedure, the Working Party considered a draft (STANA/I/4) prepared by the Secretariat. It was agreed to add the following sentence to paragraph 4: "Any members of the Working Party may suggest to the Secretary that a meeting be held". The first sentence of paragraph 6 was also amended to read as follows: "Each country and each international organization represented on the Working Party shall have one vote". Apart from these two changes, the Statute and Rules of Procedure were adopted in the form presented by the Secretariat.

5. The Chairman then went on to consider item 4, Nomination of additional members of the Working Party. It was unanimously agreed to nominate in accordance with paragraph 2 of the Statute the following additional experts as members: Professor G.M. Gerhardsen (Norway), Mr. B. Parrish (United Kingdom), and Dr. M. Rauterberg (Federal Republic of Germany). It was also agreed unanimously to nominate Dr. L. Dickie (ICNAF) and Dr. C.E. Lucas (ICES) for the duration of the present session.

6. The Working Party then considered item 5 of the Agenda: Standardization of terminology for fishing areas in statistical reporting and reviewed a memorandum (STANA/I/2) by the FAO member. After a discussion in which all members participated, stressing the importance of uniformity of terms as well as the desirability of making the least possible changes in the terminology at present used by the organizations concerned, it was unanimously agreed to recommend to the international organizations to adopt in future the following terms:

Recommended Definitions:

Region:	NORTH ATLANTIC	
	ICNAF	ICES
Area:	The whole of the Convention Area.	The whole of the area for which ICES statistics are collected.
Sub-area:	Sub-area as defined in the Convention (area covered by one panel) - designated by arabic numeral.	Statistical area designated by roman numeral.
Division:	First subdivision of sub-area designated by capital letter.	First subdivision of sub-area designated by roman numeral plus lower case letter.

It was also suggested that consideration should be given to a uniform numbering system for both ICNAF and ICES, which would facilitate reporting, but the Working Party did not come to any recommendations on this point.

7. The Chairman then opened the discussion on item 7: Progress report on preparation of fully documented edition of the Report (ESTANA/8 - Revised) of the Edinburgh Meeting. The Working Party took note of the Progress Report (STANA/I/3) submitted and recommended that the editors of the fully documented edition of the Report should incorporate in it the various developments that have occurred since the Edinburgh Meeting, including the terminology recommended at the present meeting, and that decisions taken at this meeting should also be mentioned.

8. The afternoon session was fully occupied by the discussion of item 6 of the Agenda: Standardization of statistical reporting between ICNAF, ICES and FAO. The Chairman asked Mr. Popper to introduce this subject, as the FAO Secretariat had worked on the experimental forms concerned. Mr. Popper started the description of form STANA 1W and document STANA 1W and 1E: Notes (1) containing instructions for completing the form. Apart from the fact that this form and the Notes are affected by the resolutions passed by the Working Party under item 5 - Standardization of terminology for fishing areas in statistical reporting - the Working Party agreed to make the following amendments to document STANA 1E and 1E: Notes (1):

Paragraph 2: Replace "the" at the end of the third line and insert "estimate of the".

Paragraph 3: Delete "approximate value of" from the first line.

Paragraph 4: To be rewritten for use on form 1E.

Paragraph 5: The last sentence should read: "Such summaries, while not specifically required, will be welcomed by the international organizations".

9. Concerning document STANA 1W and 1E: Notes (2), Heading I, Craft Category, the Working Party, after discussing the advisability or not of breaking down steam and motor craft into coal and oil, and gasoline, diesel or diesel-electric respectively, agreed that these more detailed categories could be deleted for the present purpose.

10. As far as Heading 2, Tonnage Class, was concerned, the Working Party noted that at present ICES does not request the countries to supply data by tonnage classes. The meeting thought that ICES should consider the adoption of the classification used by ICNAF for tonnage classes, and finally agreed that countries having data by tonnage classes should supply them according to the ICNAF classification.

11. Heading 3. The Working Party decided to replace "Gear Category" by "Fishing Method" in the title of the heading, to replace "include" by "specify" under (9), to renumber (12), Other Line, as number (13); and to amend (13) to Dories (deleting "vessel") and renumbering it as (12). It was also agreed to add (17) "Gear not specified".

12. The Working Party then took into consideration document STANA 1W and 1E: Notes (3), in which the instructions for completion of form STANA 1W continue. There was general agreement on the advisability of the establishment of a uniform code for fish species, but the Working Party deferred discussion of this problem in detail. The paragraphs concerning "Hours or nearest equivalent measure" and "Days" caused some discussion, as in practice these data may not be the result of independent measurements. It was finally agreed to leave the two paragraphs in their present form; however, the problem was pointed out to the ICNAF Sub-Committee on Statistics, which has agreed to study it.

13. The Working Party then discussed at considerable length the difficulty of allocating to the relevant divisions catches and efforts taken from more than one division during a trip. After consultation with the ICNAF Sub-Committee, it was agreed that, while in some cases allocation of the whole catch and effort of a trip to the main division where fishing had taken place would not introduce a serious error into the final compilations, the Working Party agreed that in general the allocation of catches and efforts to the separate divisions was necessary to satisfy the requirements of ICNAF and ICES.

14. The Working Party met again on 26 May 1960 at 10.30 a.m., and the Chairman opened discussion on document STANA 1W: Columns A, B and C. Mr. Popper gave explanations on this document; the Working Party decided to amend No. 12 as follows: Other flounders including not identified. The Working Party then approved this document and went on to examine the following one, STANA 1E: Columns A, B and C. Mr. Rauterberg asked whether it would have been possible to have one form only combining STANA 1W and 1E, but Mr. Popper pointed out that one form would be too big and difficult to handle because the requirements are so different in the two organizations and because of the large number of species involved. The Working Party agreed to keep the two documents.

15. The Working Party subsequently considered and approved forms STANA 2W and STANA 2E, which represent summary forms for annual figures, after Mr. Popper had given the required explanations about them.

16. The Working Party decided that the experimental forms should be tried out, using 1959 data, and that this should be done by Iceland, Germany and the United Kingdom, while Canada should be asked to review the forms in order to ensure they presented no additional difficulty in comparison with the forms already filled out for ICNAF.

17. The Working Party is to consult by correspondence and is to arrive at a decision whether such difficulties as had arisen during the experimental run justify a further meeting of the Working Party before the forms are put to general use. The Working Party also decided to recommend to the international organizations the use of the forms for the collecting of statistics from all countries for the 1960 data unless particular difficulties had come up during the experimental stage.

18. The experimental forms should be distributed during the second half of 1960, and in any case before the ICES meeting, to the four countries concerned with them in the first stage. The other countries should be informed of the progress made, and specimen forms should be distributed to them for their information.

19. ICNAF will supervise the printing and distribution of the experimental forms, in consultation with the Canadian Bureau of Statistics, who kindly offered to help.

20. The Working Party, under item 9 of the Agenda - Other Matters, discussed the problems in connection with coding systems. After considerable discussion on the desirability of a uniform coding for species and other matters concerned with the mechanical data processing of fishery statistics, the Working Party decided to ask FAO to obtain from governments represented on the Committee, and others as necessary, descriptions of the coding and system used in the preparation of statistics; and to circulate them to members of the committee prior to the next meeting along with a definite proposal, if desirable, of a uniform coding for species.

(20, continued)

(20. concluded)

It was noted that, in order to permit uniform processing of the statistics (on punch cards) from different countries, it was not necessary to have identical coding systems, but that they must be compatible in that it must be possible to convert from one to another. The whole question is to be discussed again at the next meeting of the Working Party.

21. The third meeting of the Working Party started at 1.45 p.m. on 26 May and discussion continued on item 9 of the Agenda. Dr. Bauer informed the Working Party that the Federal Republic of Germany had decided to study both conversion factors and discards by sending observers to sea to get the necessary samples and observations. The Working Party noted with satisfaction these plans and invited other countries to give information on similar developments.

22. The Working Party then considered a memorandum by the FAO member (STANA I/6) entitled Standard International Trade Classification for Fishery Products. It was agreed to recommend that a footnote be put against Group 031, Fish, fresh, chilled or frozen to say that canned products are excluded from the group. It was also decided to recommend that sub-group 081.43 be deleted and replaced with the following classification: 1/

081.5 Fish and Meat not canned

081.51 Meat
081.52 Fish and whale meat

23. The Working Party felt, that with these modifications, the FAO proposals represented a desirable improvement of the SITC-BTN III draft. It expressed the view that a satisfactory classification of fishery products was of great value to countries for which fish provided important export items, and decided to recommend to the international agencies and to the governments represented that they urge the United Nations to delay introduction of the SITC-BTN III in order to give time for its more careful consideration in the light of the requirements of specialized international organizations such as those represented on the Working Party. It also requested the Director-General of FAO to bring this recommendation to the attention of governments participating in ICES and ICNAF.

24. The Working Party also considered the progress made in the implementation of the recommendations of the Edinburgh Meeting. In particular, it noted that ICES had recommended to cease collecting and publishing statistics for the Newfoundland subarea, but not for West Greenland 2/. The Working Party regretted

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1/ See Appendix II, Optional subheadings of the SITC, Revised, Statistical Papers, Series M, No. 34, United Nations, 1961.

2/ The Working Group, appointed by the Statistical Committee of ICES at the 49th Statutory Meeting, Charlottenlund, October 1961, proposed "that the ICES Area for statistical purposes be considered to cover the north-eastern part of the Atlantic and that it would continue to include the West Greenland Sub-area (Sub-area XV). The southern-most boundary would be 30° north and the ICES statistical area would include Divisions X and X b. These two latter divisions could be excluded at a later date and the southern boundary moved northwards to 36° north when it appears that another intergovernmental body is collecting and publishing fisheries statistical data for the Atlantic area lying immediately south of 36° north". (See 1961 Report of Statistical Committee of ICES, Section 5.).

24. (concluded)

that ICES had not yet found it possible to eliminate completely overlapping of the statistics collected by them with those collected by ICNAF and hoped that ICES would reconsider this matter, or possibly agree to publish their statistics in such form as to exclude catches in the West Greenland subarea from the totals.

25. The Working Party decided that the present report be distributed to (a) all governments of countries which had been invited to the Edinburgh Meeting, (b) to all participants in the Edinburgh Meeting, (c) to the members of the Working Party itself, (d) to the United Nations Statistical Office, and (e) to OEEC, EEC and EFTA.

26. As far as item 10 of the Agenda was concerned, i.e. date and place of next meeting, the Working Party felt that, unless an earlier meeting proved necessary the next meeting could possibly be held in conjunction with the FAO Technical Meeting on the Economic Effects of Fishery Regulations, tentatively scheduled for June 1961, in Ottawa.

ANNEX K

CONTINUING WORKING PARTY ON FISHERY STATISTICS IN THE NORTH ATLANTIC AREA 1/

Report on the Second Session
Washington, D.C.; 6 - 8 June 1961

R E P O R T

1. GENERAL

1.1 Second Session

The opening meeting of the second session took place in Room 5237 of the United States State Department Building, located on Virginia Avenue, between 21st and 23rd Streets, N.W., Washington, D.C., U.S.A., at 10.00 hours, Tuesday morning, 6 June 1961.

The six meetings of the second session took place in the same room at the following times:

6 June - Tuesday morning:	10.00 - 12.00
6 June - Tuesday afternoon:	14.00 - 17.30
7 June - Wednesday morning:	9.30 - 12.00
7 June - Wednesday afternoon:	14.00 - 17.15
8 June - Thursday morning:	9.30 - 12.15
8 June - Thursday afternoon:	14.00 - 16.30

1.2 Membership

The following members and co-opted members of and observers to the Working Party were able to be present at all or some of the various meetings of the second session:

Mr. F.S. Allen (member, United Kingdom)
Mr. M. Elísson (member, Iceland)
Dr. G. Krefft (member, Germany)
Mr. J.N. Lewis (member, Canada)
Dr. A. Fridriksson (member, ICES)
Mr. F.R. Thomas (member, ICNAF)
Mr. F.E. Popper (member, FAO)
Mr. E.A. Power (Co-opted member)
Dr. W.R. Martin (Co-opted member)
Mr. B.B. Parrish (Co-opted member)
Mr. A. Proulx (observer, Canada)
Dr. C. Moecklinghoff (observer, Germany)
Mr. L.P.D. Gertenbach (Secretary, FAO)

1/ Reproduced as STANA II-61/11 Report.

2. OPENING OF THE MEETING AND ADOPTION OF AGENDA (Agenda Item 1.1)

2.1 Mr. M. Elísson, elected vice-chairman at the first session, 1960, took the chair in terms of Paragraph 3 of the "Statutes and Rules of Procedure", and opened the meeting.

2.2 The acting chairman invited comments on the draft agenda. Mr. F.R. Thomas (ICNAF) proposed that item 2.1 be postponed until later when Mr. Parrish would be available. It was also suggested that the agenda be considered flexible so that members, also active in the ICNAF meeting, could participate in the deliberation of the Working Party. Mr. J.N. Lewis (Canada) then expressed certain doubts about the interpretation of the terms of reference of the Continuing Working Party. It was decided, following a short discussion of the points raised by Mr. J.N. Lewis (Canada), to insert a new agenda item 1.5 "TERMS OF REFERENCE" and to postpone discussion of agenda item 1.3 until after completion of discussion of new item 1.5.

2.3 The following agenda was adopted:

1. GENERAL MATTERS

1.1 Adoption of Agenda
1.2 Election of Officers (Chairman and Vice-Chairman)
1.3 Change in name of the Continuing Working Party
1.4 Nomination of Additional (co-opted) Members
1.5 Terms of Reference

2. TECHNICAL MATTERS RECEIVING CURRENT ATTENTION

2.1 Progress on the Preparation, Editing and Publishing of Fishery Statistics in the North Atlantic Region (the fully documented report on the 1959 Expert Meeting in Edinburgh)
2.2 Stana Forms 1E, 1W and 2, and Notes for their Completion
2.3 Manpower Statistics
2.4 FAO International Standard Statistical Classification of Aquatic Animals and Plants
2.5 FAO International Standard Statistical Classification of Fishery Commodities
2.6 Division of the World's Fishing Grounds by Regions and Areas

3. TECHNICAL MATTERS ON WHICH NO ACTION HAS YET BEEN TAKEN

3.1 Conversion Factors
3.2 Fish Discards
3.3 Fishing Effort
3.4 Fishing Craft
3.5 Quantities of Fish Reported as Unsorted and Unidentified

4. OTHER MATTERS

4.1 Date and Place of Third Session of the Continuing Working Party on Fishery Statistics in the North Atlantic Area
4.2 Any other matters

3. ELECTION OF OFFICERS (Agenda Item 2.1)

The acting chairman asked for nominations for chairman. Mr. F. Allen (U.K.) nominated by Dr. Fridriksson (ICES) and seconded by Mr. Popper (FAO), was unanimously elected chairman. On nomination by Mr. Popper (FAO), Mr. Elísson (Iceland) was unanimously re-elected vice-chairman.

4. NOMINATION OF CO-OPTED MEMBERS (Agenda Item 1.4)

4.1 The position of "alternates" to Members was reviewed. It was decided to interpret the Statutes and Rules of Procedures in such a way that these "alternates" could function as observers (unless nominated as Co-opted members) until the Secretary is informed by the Member of the temporary nomination of the observer, in the absence of the Member, as a full member with regard to the voting rights as defined in Paragraph 6 of the Statutes and Rules of Procedure.

4.2 Under this agenda item the Working Party also considered the need to specify precisely the time period of the membership of co-opted members. It was decided that the words "for any specified session or sessions" be added after the word "itself" at the end of Paragraph 2 of document STANA/I/4 (Revised 14 June 1960).

5. TERMS OF REFERENCE (Agenda Item 1.5 - New Item)

5.1 Mr. Lewis (Canada) considered some of the topics with world-wide implications to be too wide in coverage to fit in with the scope of the Continuing Working Party's activities which appear to be confined to the North Atlantic.

5.2 Mr. Popper (FAO) expressed the opinion that it was quite in order to raise in the Continuing Working Party matters of a world-wide application provided that these matters apply also to the North Atlantic region's fishery industries. This approach would seem to be in line with the approach followed by the Expert Meeting in September, 1959.

6. CHANGE IN NAME OF CONTINUING WORKING PARTY (Agenda Item 1.3)

6.1 Following explanations by Mr. Popper (FAO) and the Secretary, it was decided to change the name of the Continuing Working Party on Fishery Statistics in the North Atlantic Area by substituting for "Area" the word "Region".

6.2 The Secretary was instructed to communicate this decision to the Director-General of FAO, the Secretary-General of ICES and the Executive Secretary of ICNAF for their approval as required by paragraph 11 of the Statute and Rules of Procedure (Stana/I/4, 14 June 1960).

6.3 The Secretary is to inform the members as soon as the required approva. has been obtained.

7. PROGRESS ON THE PREPARATION, EDITING AND PUBLISHING OF "FISHERY STATISTICS IN THE NORTH ATLANTIC REGION" (THE FULLY DOCUMENTED REPORT ON THE 1959 EXPERT MEETING IN EDINBURGH) (Agenda Item 2.1)

7.1 Mr. Parrish (Co-opted member) presented his second and final progress report followed by a report by the Secretary on the typing, proofreading and processing of the manuscript by the FAO Secretariat.

7. (concluded)

7.2 The Working Party noted that FAO intends to have available by August advance copies and to distribute copies during the latter half of 1961.

8. STANA FORMS 1E, 1W and 2, AND NOTES FOR THEIR COMPLETION (Agenda Item 2.2)

8.1 The Working Party devoted by far the larger part of the six meetings to a detailed review of the three proposed reporting forms and of the related instruction notes. In the light of comprehensive comments provided by the members, co-opted members and observers of the Working Party these forms are to be partly redesigned and the notes revised.

8.2 The Working Party instructed the Secretary to prepare and issue before mid-July redesigned forms (single-sheet versions in black printing only) for further comment and/or experimental work by Canada, Germany, Iceland, and the United Kingdom and possibly also the United States. The revised notes should also be circulated. After comments by members of the Working Party, copies of the forms and notes should also be sent for information to other member countries of ICES and ICNAF and other interested persons. FAO should be in receipt of all comments by 1 September 1961 and, if revised forms are acceptable, then it should proceed with the printing and distribution of the finally approved versions. These should be dispatched to the countries not later than 1 January 1962.

8.3 The Working Group also noted that, as a result of standard reporting, some countries would find it necessary to make adjustments in their machine-processing of data and that the international organizations would also be required to make changes in their methods and publications. It was felt that the permanent benefits that will accrue from the new forms will eventually outweigh any temporary difficulties.

8.4 Taking into account that the countries reporting to both ICES and ICNAF would find their task appreciably reduced if the various forms used were as far as possible alike, the Working Party again draws attention of all governments and international organizations to the following paragraph No. 45 appearing in the Report of the Expert Meeting of 1959:

> "The Meeting recommends that the order of species groups adopted by FAO should be used on the proposed reporting form and that ICES and ICNAF, whilst not each requiring the same amount of detail or necessarily the same species order, should accept the order and merely extract from the tables furnished the information required by them."

8.5 The Working Party recommended that FAO should be responsible for the costs of the forms but that it should be reimbursed by ICNAF and ICES annually to the extent of the savings accrued to these bodies.

9. MANPOWER STATISTICS (Agenda Item 2.3)

The Working Party noted the progress made by FAO in collecting data covering full-time, part-time and occasional fishermen. It wants to stress that these figures would require amplifications by means of footnotes. The FAO representative indicated that the tables would be issued in mimeographed form for further comments by experts and by the national authorities before they appear in a new section in the Yearbook.

10. THE FAO INTERNATIONAL STANDARD STATISTICAL CLASSIFICATION OF AQUATIC ANIMALS AND PLANTS AND THE FAO INTERNATIONAL STANDARD STATISTICAL CLASSIFICATION OF FISHERY COMMODITIES (Agenda Items 2.4 and 2.5)

10.1 The secretary pointed out that the revisions in these FAO Classifications are submitted to the Working Party to obtain approval for the changes to be made when inserting the revised classification in the publication - "Fishery Statistics in the North Atlantic Region" (see Paragraph 7). Although some members doubted the competence of the Working Party to express an opinion on these world-wide classifications it was nevertheless felt that the FAO Secretariat could proceed with the proposed revisions.

10.2 The Working Party accepted the FAO proposal to place all the whales in one division within the classification of Aquatic Animals and Plants to make it easier to stress their exclusion from the statistics collected by FAO directly from national reporting offices.

10.3 The Working Party pointed out that the word "lampreys" should be deleted from the title of Group 51 in Appendix B to STANA II-61/6 and that the freshwater Cyclostomata spp. (lampreys) should be listed under Species Group 11 ("Freshwater fishes") and the marine hagfishes under Group 17 ("Mullets, jacks, sea-basses, etc.").

10.4 The Secretary in presenting paper STANA II-61/7 explained why it is becoming urgent to develop a further breakdown of the species groups and a re-arrangement of the statistical categories presented in Section C of the Yearbook. The FAO proposal to develop the new statistical arrangement as shown in Appendix B of this paper was fully endorsed by the Continuing Working Party whose members indicated that although they strongly approved the proposal, they would also like to see the retention of the existing tabulations which are proving most useful in national offices.

11. DIVISION OF THE WORLD'S FISHING GROUNDS BY REGIONS AND AREAS (Agenda Item 2.6)

The Working Party noted the need for defining more precisely the "North Atlantic Region" and considered that this would also affect the definition of adjacent areas. The Working Party felt that consultations on this matter between the various inter-regional and international bodies are highly desirable, and that FAO should initiate these.

12. CONVERSION FACTORS (Agenda Item 3.1)

Taking into account the difficulties of presenting adequate conversion factors of all kinds due to constantly changing conditions in the different branches of the fishing and fish-processing industries of the various countries fishing in the North Atlantic, the Working Party suggested that while FAO should encourage countries to develop and keep ut-to-date such data and should try to obtain and keep on its file such currently used conversion factors, FAO should not yet attempt to produce a comprehensive publication on conversion factors.

13. FISH DISCARDS AND FISHING EFFORT (Agenda Items 3.2 and 3.3)

The Working Party recommends that ICES and ICNAF should continue with their current work on (i) fish discards and (ii) fishing effort and refers them to paragraphs 61 trough 64 and 74 through 79 respectively of the Report of the 1959 Expert Meeting as reproduced in STANA II-61/9.

14. FISHING CRAFT (Agenda Item 3.4)

The Working Party noted the need for greater international comparability in the statistics covering the fishing fleets of the countries fishing the North Atlantic. As FAO publishes fishing fleet data in its Yearbook,it requests FAO to investigate the possibilities of improving the international comparability of the nationally provided data.

15. QUANTITIES OF FISH REPORTED AS UNSORTED AND UNIDENTIFIED (Agenda Item 3.5)

15.1 The Working Party again noted the urgency to improve the adequacy of national fishery statistics by reducing the quantities of fish reported as "unsorted or unidentified". The Working Party draws the attention of all governments to paragraph 47 of the Expert Meeting (1959, Edinburgh) which reads as follows:

> The Meeting also recommends to governments that the quantity of fish reported as unsorted and unidentified should not exceed 10 per cent of the total nominal catch or 10,000 metric tons whichever is the less. Governments which have difficulties in recording their catch in the required detail should use sampling techniques to apportion the unsorted and unidentified quantities to the species or species groups reported.

15.2 Noting that this matter affects ICES and FAO Statistics in particular the Working Party urges these two organizations to investigate this problem and to encourage governments to improve their statistics as recommended.

16. OTHER MATTERS (Agenda Items 4.1 and 4.2)

16.1 The Working Party felt that it is advisable to avoid overlapping of the meetings of its future sessions with those of other fishery organizations.

16.2 The Working Party decided that the date for the 1962 session would depend largely on progress made with the STANA forms (see Paragraph 8.4) during the latter half of 1961, and that it might prove desirable to hold a further meeting of the Working Party in the latter part of 1961. It was therefore agreed to leave the date and place open and to ask the Secretary to settle these by correspondence with members as soon as the dates and places for other fishery meetings during 1962 are known more precisely.

Some Unserialized Documents Produced by FAO Fisheries Division Before January 1962

1961 RESEARCH VESSEL DESIGN. Covering summary of discussions and papers of the Research Vessel Forum, 18–30 September 1961, Tokyo, Japan.

1961 FUTURE DEVELOPMENTS IN THE PRODUCTION AND UTILIZATION OF FISH MEAL. Vol. I and II. Report of the International Meeting on Fish Meal, Rome, 1961. Available in English, French and Spanish.

1961 REPORT OF THE PREPARATORY MEETING ON THE CREATION OF A CONSULTATIVE FISHERIES BODY IN WEST AFRICA, Dakar, Senegal, 15–20 May 1961. Also available in French.

1961 REPORT TO THE IMPERIAL ETHIOPIAN GOVERNMENT ON A RECONNAISSANCE SURVEY OF LAKE ABAYA (MARGHERITA) ETHIOPIA. Based on the work of D.R.Riedel, 1960.

1961 SOME ASPECTS OF THE MARKETING OF DRIED FISH IN CENTRAL AND WEST AFRICA. Available in English and French.

1961 INFORME AL GOBIERNO DE CHILE SOBRE LA PESCA EN AGUAS CONTINENTALES EN LA REGION DE LOS LAGOS. Report based on a visit Cecil Miles made to Chile from November to December 1959. Issued as Fisheries Biology Report No. 28.

1960/1961 PROCEEDINGS OF THE WORLD SCIENTIFIC MEETING ON THE BIOLOGY OF SARDINES AND RELATED SPECIES, FAO, Rome, September 1959. Volume I – Report: in English, French or Spanish. Volumes II and III – Technical Papers – in original language (English/French/Spanish).

1960 REPOPT OF THE TECHNICAL MEETING ON CREDIT FOR FISHERY INDUSTRIES, Paris, 1960. English edition 1960. Spanish edition 1961. French in press.

1960 REPORT TO THE GOVERNMENT OF TURKEY ON THE PROPOSED ESTABLISHMENT OF AN INSTITUTE FOR INLAND FISHERIES RESEARCH. Based on the work of W.C.Beckman.

1960 DEVELOPMENT OF THE SEA FISHERIES OF IRELAND. Based on the work of I.S.McArthur.

1960 PROCEEDINGS AND BASIC WORKING PAPERS OF THE TECHNICAL MEETING ON FISHERY COOPERATIVES, Naples, 1959. In English, French and Spanish.

1960 THE EFFECT OF FISHING ON RESOURCES AND THE SELECTIVITY OF FISHING GEAR. Proceedings of the Joint Scientific Meeting of ICNAF, ICES and FAO on Fishing Effort, Lisbon 1957. Vol. I – Report.

1960 REPORT OF THE FIRST MEETING OF THE EUROPEAN INLAND FISHERIES ADVISORY COMMISSION, Dublin 1960. Bil. English/French.

1959 REPORT OF THE TECHNICAL MEETING ON COSTS AND EARNINGS OF FISHING ENTERPRISES, London 1958.

1957 THE ECONOMICS OF FISHERIES. Proceedings of a Round Table organized by the International Economic Association and held in Rome in September 1956, sponsored by the Food and Agriculture Organization of the United Nations. Edited by Ralph Turvey and Jack Wiseman. Reprinted 1959.

1957 PURPOSES AND METHODS OF FISHERY STATISTICS. Report of the First FAO International Meeting on Fishery Statistics, Copenhagen, Denmark, 1952.

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